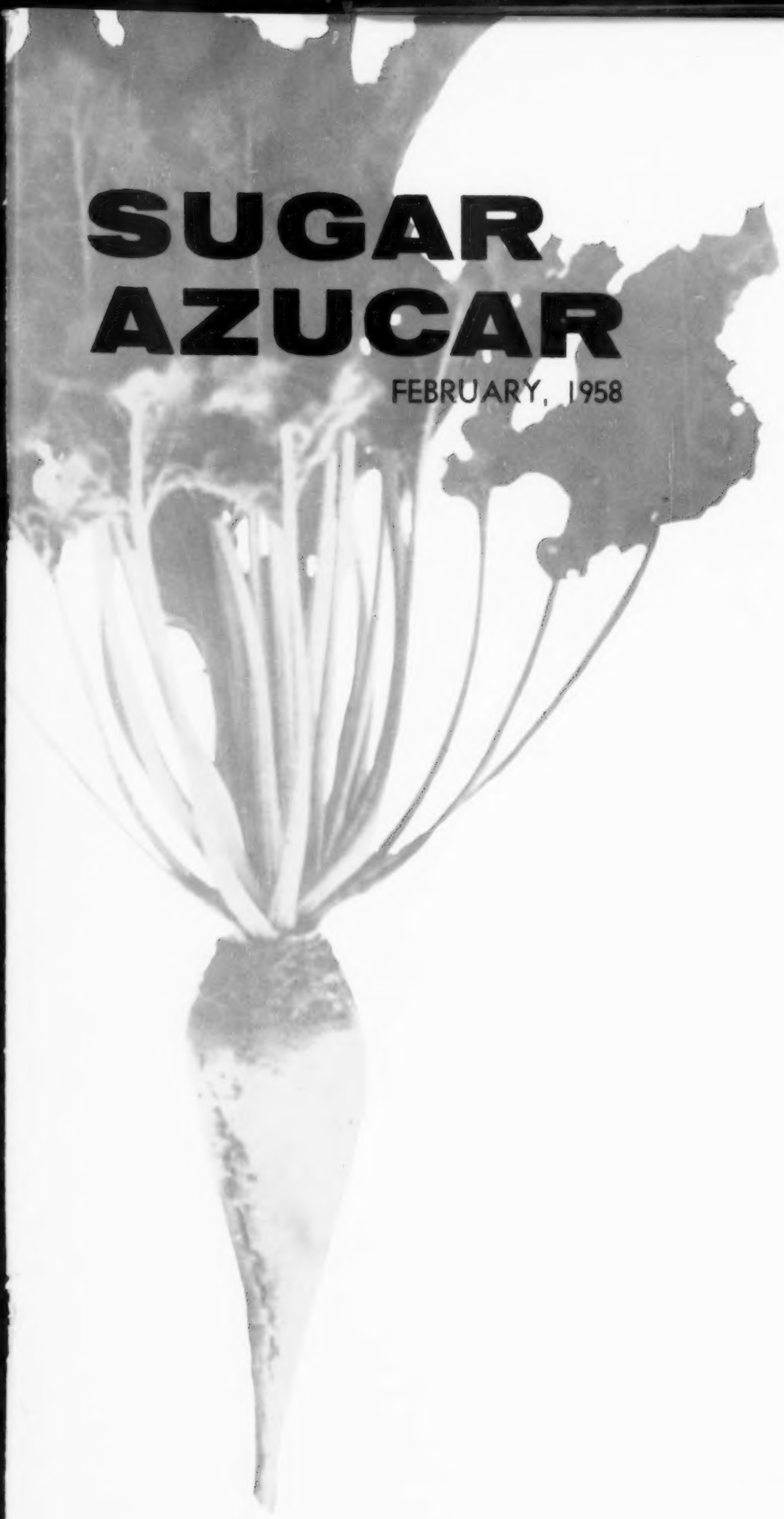
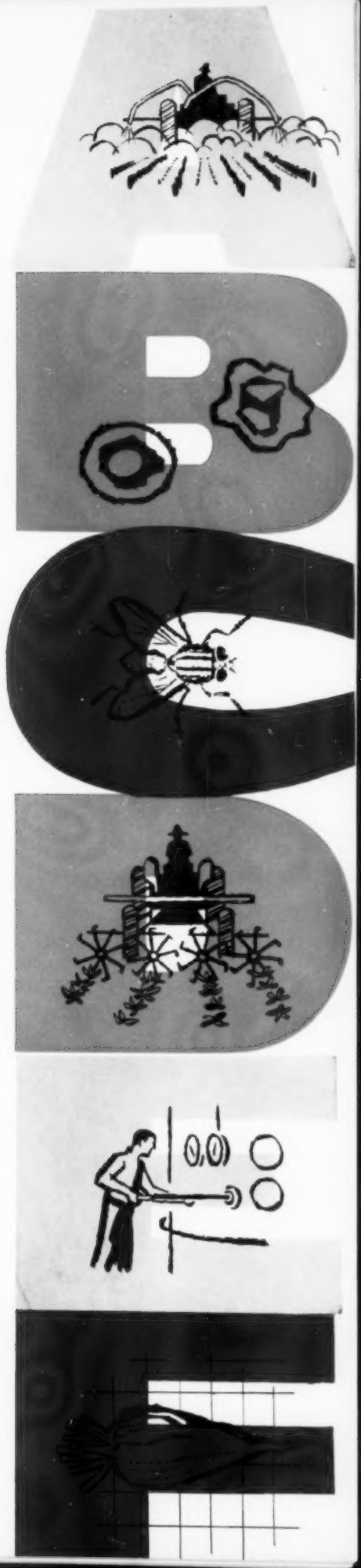
SUGAR
AZUCAR

FEBRUARY, 1958





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LQ600®

Here's Why: Long accepted valve maintenance costs are a thing of the past in thousands of plants where LQ600's have been installed . . . even in the most severe services where previous valves required repair or replacement after as little as two weeks on the line.

These outstanding savings are made possible by seats and discs of Brinalloy®, a patented Lunkenheimer alloy that is more resistant to wear and corrosion than 500 Brinell Stainless or 1000 Brinell Case-Hardened Stainless Steel.

Add to this the Lunkenheimer exclusive silicon-bronze Stemalloy®, the most durable stem material ever put into a valve, and you have two important reasons why LQ600's have established new low-maintenance standards everywhere they are installed.

For an actual comparison test, call the Lunkenheimer Distributor in your area. He is an expert on valve maintenance costs and will be glad to demonstrate the maintenance-saving benefits you receive when you install LQ600's . . . or write The Lunkenheimer Company, Cincinnati 14, Ohio

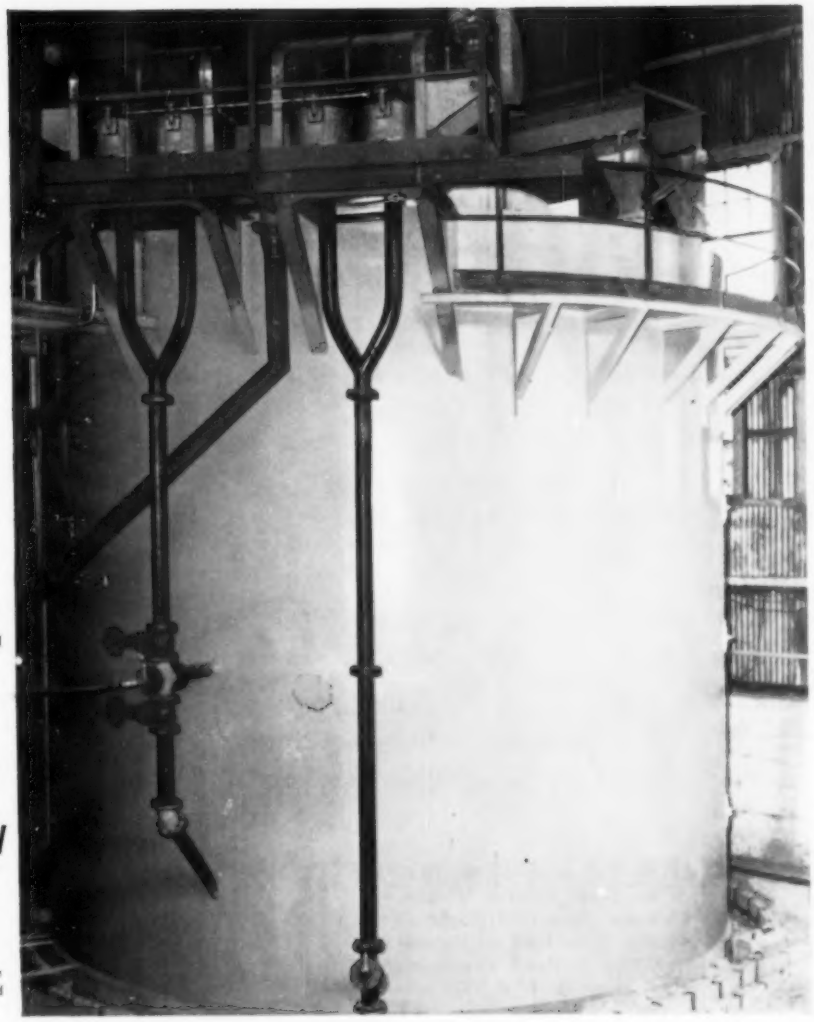
LUNKENHEIMER LQ QUALITY

LUNKENHEIMER®

THE ONE *Great* NAME IN VALVES

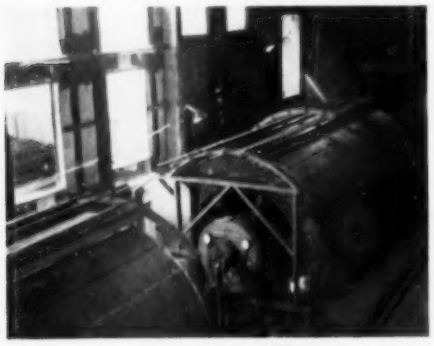
First RapiDorr in Hawaiian Islands...

Paia Factory Successfully Handles Juices from Mechanically Harvested Canes...



New 22′ dia. RapiDorr Cane Juice Clarifier at Paia Factory of Hawaiian Commercial and Sugar Co., Ltd.

Elevated view of the two new 8′ x 16′ Stainless Steel Oliver-Campbell Cane Mud Filters at Paia.



As part of their 1956 modernization program, Hawaiian Commercial and Sugar Co., Ltd. installed a 22′ RapiDorr cane juice clarifier and two 8′ x 16′ stainless steel Oliver-Campbell Cane Mud Filters at their Paia factory.

This newly installed RapiDorr Clarifier has a volume of 59,000 gallons and handles approximately 75% of the total juice flow. The balance of juice is clarified in an 18′ dia. Multi-feed unit having a volume of 31,400 gallons. The daily grinding rate at Paia is approximately 3,300 tons of cane.

The successful operation of the new RapiDorr at the Paia factory verifies by demonstration the excellent performance of this unit *even* when handling juices of high solids content as produced from mechanically harvested canes.

RapiDorr T.M. Reg. U.S. Pat. Off.

CANE SUGAR DIVISION — DORR-OLIVER INCORPORATED — STAMFORD, CONNECTICUT

DORR-OLIVER
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WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
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SUGAR y AZUCAR

Volume 53, No. 2 February, 1958

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COVER *This month's cover is dedicated to the Tenth General Meeting of The American Society of Sugar Beet Technologists being held this month in Detroit, Michigan. Panel on the right suggests the six sections: A—Agronomy; B—Genetics and Variety Improvement; C—Entomology and Plant Pathology; D—Agricultural Engineering; E—Chemistry and Factory Operation; F—Physiology.*

CUBIERTA *La cubierta de este mes está dedicada a la Décima Reunión General de la Asociación Norteamericana de Tecnólogos de Azúcar de Remolacha (The American Society of Sugar Beet Technologists) que se celebra este mes en Detroit, Michigan. La parte derecha de la plana representa las seis secciones: A—Agronomía; B—Genética y Mejoramiento de Variedades; C—Entomología y Patología Vegetal; D—Ingeniería Agrícola; E—Química y Operación de Ingenios; F—Fisiología.*

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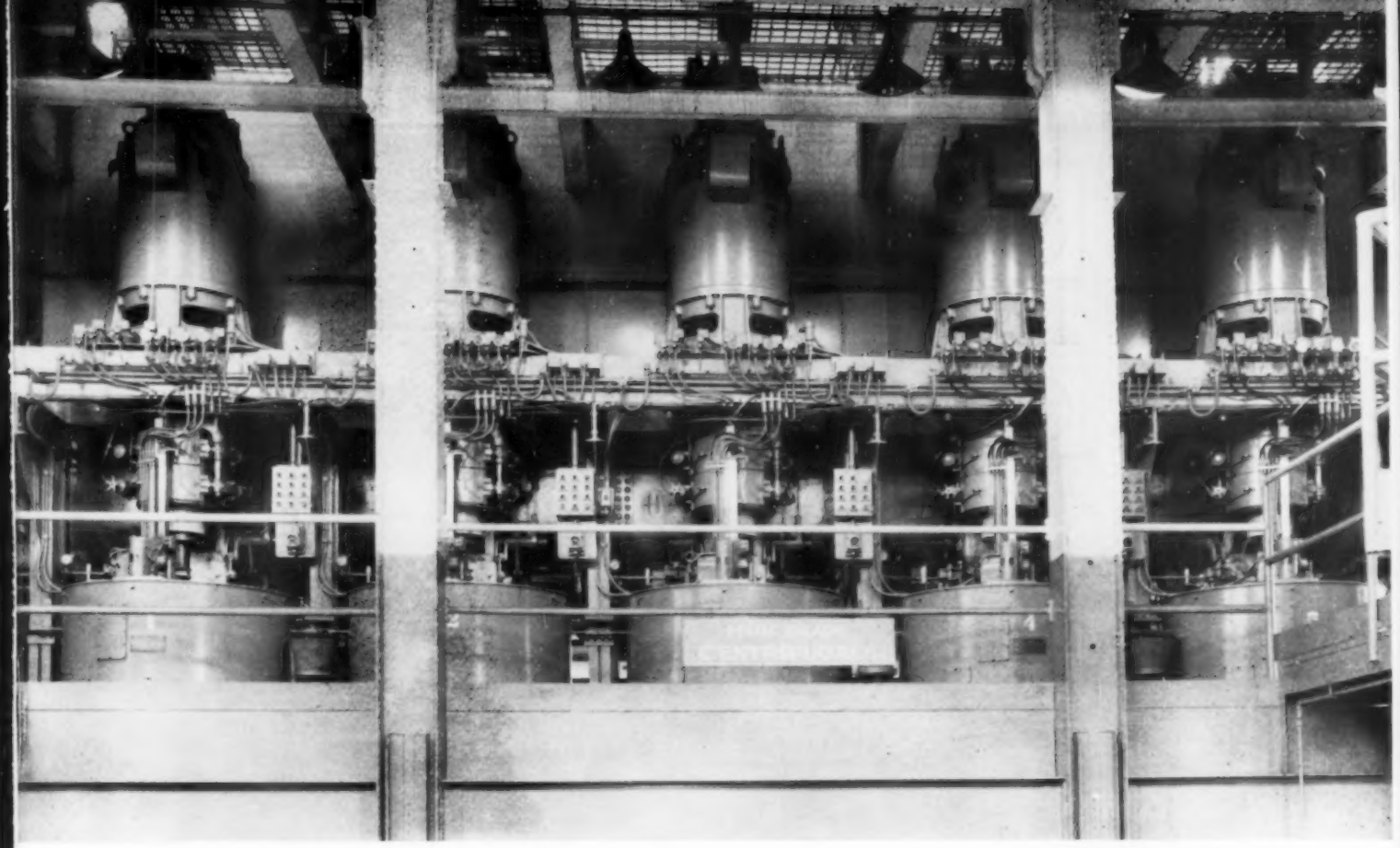


A COMPLETELY AUTOMATIC CENTRIFUGAL INSTALLATION IN

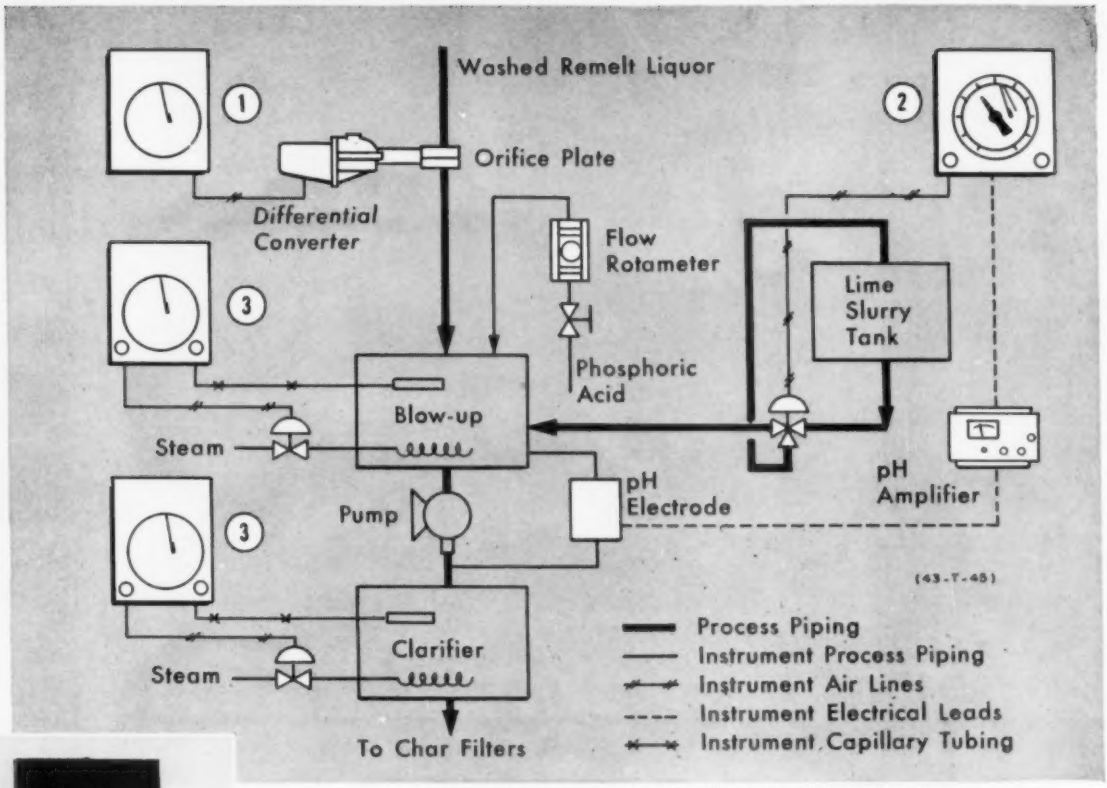
Hawaii

Shown here is a new Western States centrifugal installation producing shipping sugar at Ewa Plantation, Ewa, Oahu, T.H. It is composed of five Roberts G-8, completely automatic, electric drive centrifugals providing automatic loading, automatic washing, automatic reverse plowing, and independent automatic recycling. Basket size is 48" x 30" x 7", motors are special vertical squirrel cage type, 2 speed 600/1200 RPM (synchronous).

A "repeat" customer of Western States, Ewa Plantation installed their first Western States equipment in 1925. Those who **know** Western States equipment **prefer** Western States equipment. Be sure **you** have factual data from Western States before you make your preference for centrifugals or centrifugal station equipment.

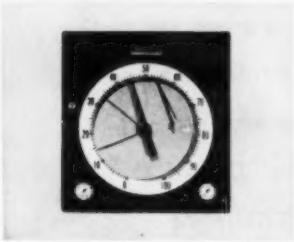
ROBERTS STEVENS

The **WESTERN STATES** MACHINE COMPANY
HAMILTON, OHIO, U.S.A.



Honeywell instrumentation controls a phosphoric acid-lime defecation process.

(1) Flow Meter—Measures flow of washed remelt liquor.



(2) ph Controller—Measures pH of defecation liquor, controls rate of addition of lime slurry to maintain pH at constant value.

(3) Temperature Controllers—Control temperatures in defecator "blow-up" tank and clarifier tank.

Automatic control of remelt defecation

with Honeywell instrumentation

See how Honeywell instrumentation is applied in a typical remelt defecation process to control flow, temperature and pH. These accurate, automatic controls make the process a continuous one . . . keep quality and production up and costs down.

These automatic controls can perform far more accurately, quickly and reliably than manual controls manned by even the most skilled operators. Honeywell instrumentation brings major benefits when applied to affination, crystallization and many other phases of refining.

Your nearby Honeywell field engineer can give you valuable assistance in putting instruments to work in your own refinery. Check with him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.

Honeywell

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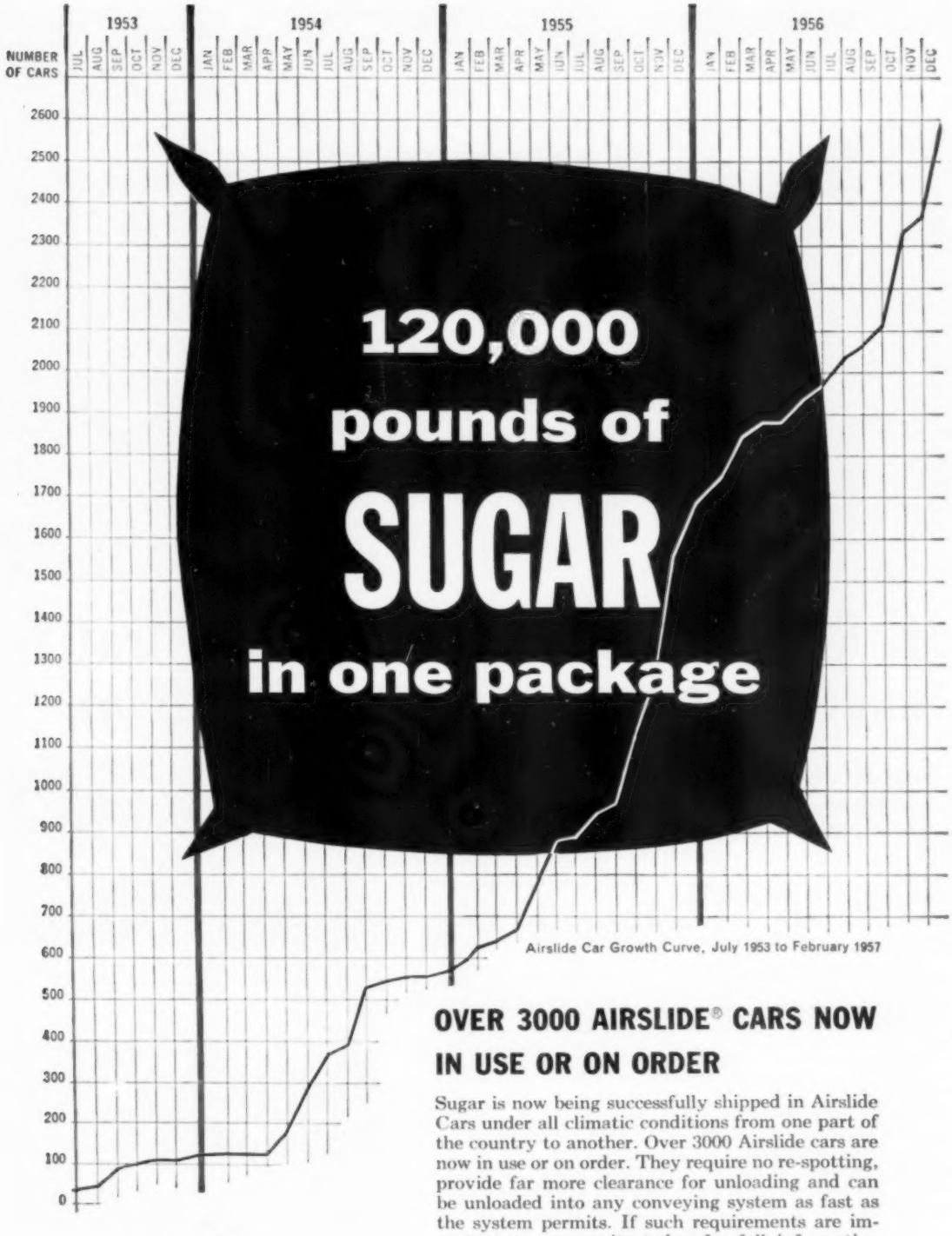

120,000 pounds of SUGAR in one package

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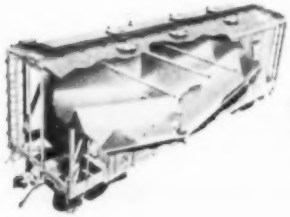
Sugar is now being successfully shipped in Airslide Cars under all climatic conditions from one part of the country to another. Over 3000 Airslide cars are now in use or on order. They require no re-spotting, provide far more clearance for unloading and can be unloaded into any conveying system as fast as the system permits. If such requirements are important to you, write today for full information about General American's Airslide car.



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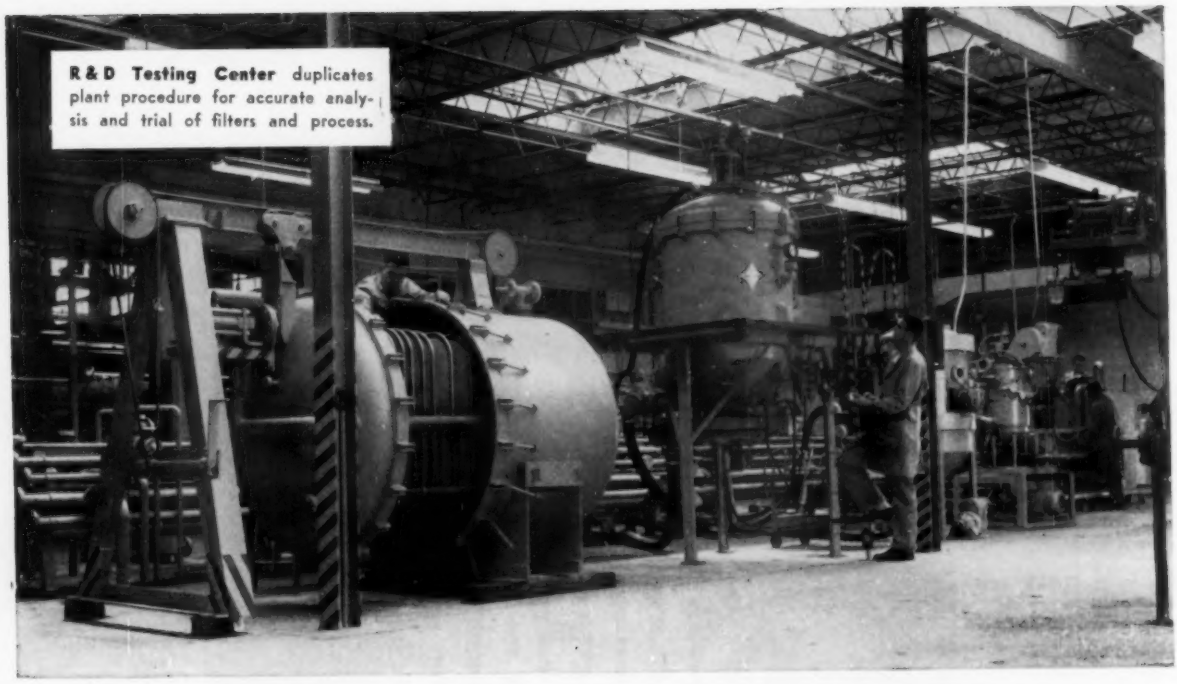


R & D Testing Center duplicates plant procedure for accurate analysis and trial of filters and process.

New Research Center analyzes filtration under full-scale process conditions

Industrial's Research and Development Division helps you select filters and study processes without disturbing production in your own plant.

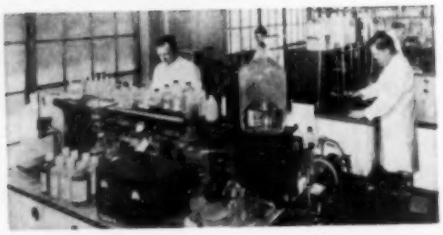
Maximum efficiency in filtration can only be gained by **examining filters and the process in actual operation.**

To do this, Industrial can place at your disposal $250,000 worth of equipment and a staff of chemists, engineers and physicists experienced in the problems of liquid-solid separation.

The Testing Center includes all types of pressure filters, batch and slurry tanks, heating and cooling systems, chemical addition systems, and various pumps . . . all interconnected with an ingenious valve and piping system. **Any conceivable process condition can be duplicated at Industrial.** Fluids can be routed from batch or slurry tanks to any filter to test its effectiveness, operating efficiency, and make rapid comparisons of filter types. The process itself can be studied thoroughly and **comparative data on variations is obtained in minutes** instead of days of costly experimentation in your plant.

Industrial builds filters for your processes with the same scientific approach and practical engineering skills that produced this advanced analytical center.

Talking to an Industrial field engineer will put you in touch with the most capable staff and research facilities available today. Bring your filtration problems to Industrial. We will be glad to make analyses and recommendations.



R & D Chemical Laboratory checks and maintains quality control of influent and provides precise analyses of effluent during testing and research operations.

R & D Physical Lab. . . . analyzes densities, viscosities and other physical properties of process fluids . . . enables engineers to check filters and make pilot runs under simulated conditions.

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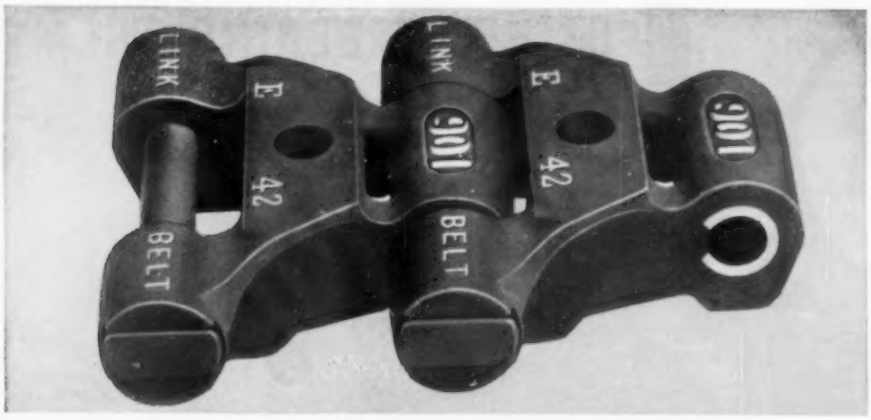
Use all-stainless steel intermediate cane carrier chain to resist corrosion



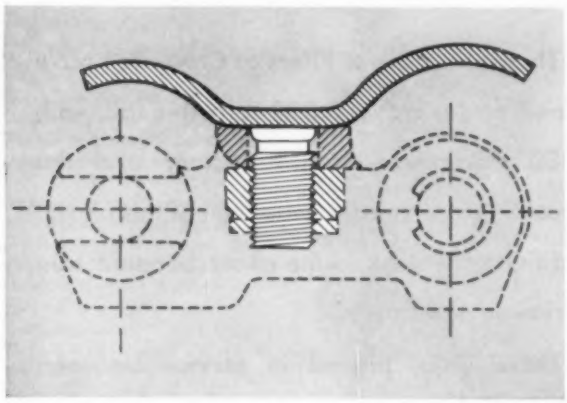
Sturdy Link-Belt chain withstands heavy loads, cuts conveyor downtime

Link-Belt Class 900 all-stainless cast steel chain has the durability to stand up under the most grueling and corrosive intermediate carrier conditions. Its greater wear life means longer, trouble-free operation . . . fewer conveyor shutdowns.

This long-wearing chain features accurately cast links of stainless steel to resist corrosion. What's more, links can be removed for varying the lengths of carriers or for quick, low-cost replacement.

Outside driving lugs cast integral with each link engage double sprockets. This action eliminates jamming of sprocket and chain when bagasse packs in center of link.

Link-Belt offers intermediate carrier chains in Class 901, 902 and 907 sizes. In addition to stainless steel, they're made in many combinations of malleable iron, Promal, or bronze links, with case-hardened or stainless steel pins and bushings to meet specific needs.



New welded stud slats speed servicing, cut downtime

Here's the most important improvement in intermediate cane carriers since Link-Belt's introduction of deep-beaded slats. Incorporating the same high rigidity and jam prevention features, the new welded stud design goes a big step further by eliminating slat holes, preventing juice leakage, resisting corrosion.

Longer carrier life is assured because slats and chains are properly matched. Multiple chains stay in line and undue stresses are eliminated. Stainless steel self-locking nuts remain tight . . . make assembly and disassembly easy.

These slats are available for carrier chain attachments of the one hole type and in corrosion-resistant metals as well as carbon steels to meet today's ever-increasing milling speeds and grinding capacities. Interchangeable with bolted slats, they're ideal for replacements as well as new installations.

14,637

For longer chain life, use Link-Belt sprocket wheels

Link-Belt cast-tooth sprockets assure top chain performance. Teeth are properly shaped, cast accurately and carefully ground to fit the chain exactly. Available in gray iron, steel or file-hard Flint-Rim.

Link-Belt chains for sugar service . . . HERE ARE JUST A FEW:

Class C combination malleable and steel chains for feeding tables . . . Class SS and LXS steel roller chains for main cane carriers, bagasse carriers and for heavy-duty drive service . . . Class 1100 malleable or Promal chains for short center and light load bagasse carriers . . . Class 900 malleable, Promal, bronze and stainless steel chains for intermediate cane carriers . . . Class 400 pintle malleable or Promal chains for juice strainers. Let Link-Belt help you select the right chain for your needs.

For facts, call your Link-Belt representative—or write direct.

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LINK-BELT COMPANY: Engineers • Manufacturers • Exporters of Machinery for Handling Materials and Transmitting Power • Established 1875. **EXPORT DIVISION:** 2680 Woolworth Bldg., New York 7, U.S.A., Cable Address: Linkbelt—New York • Representatives throughout the World.

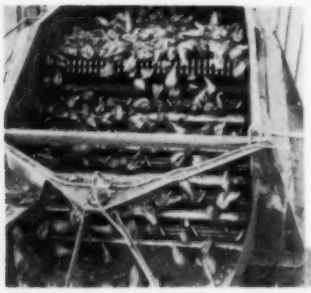
3 THREE OF A KIND

WITH 266,000,000 LBS. OF BEETS BEHIND THEM

These three Silver Pilers at Crookston have cleaned and piled 160,000 tons this fall, with 27,000 transferred to the factory and the harvest 85% complete at the time of this photo. Conditions are slack in the photo because rain has slowed the harvest.

These units, placed in service between 1948 and 1954, are all 36" pilers with end-dump platforms—a feature which simplifies and speeds truck haulage.

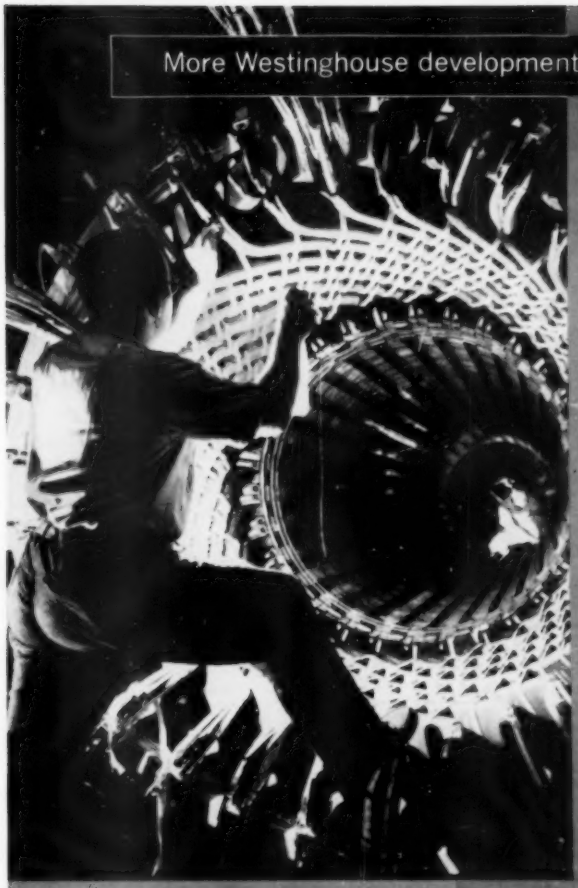
Investigate the very newest feature of Silver Pilers—the Grab-Roll Screen, designed for effectiveness in mud, rocks and trash. It really does the job.



SUGAR MACHINERY FOR FIELD AND FACTORY

SILVER ENGINEERING WORKS, INC.
3309 Blake Street, Denver 5, Colorado

More Westinghouse developments for industry



High-voltage insulation with a memory puts a stop to insulation migration

Now—Westinghouse research has provided insulation that expands with a machine's conductors . . . insulation that "remembers" its exact original shape (and returns to it) when conductors shrink back to "cool size." Called Thermalastic®, this development overcomes completely the hazards of insulation migration . . . resists moisture and contamination . . . never becomes brittle with age. Available only on Westinghouse large rotating apparatus, Thermalastic is one *more* reason for specifying Westinghouse generators, synchronous condensers, frequency changers, and large motors. Request "Booklet E" for details about this great Westinghouse development.

For information on any of the developments shown here, or for help on your specific engineering problems, write to *Westinghouse Electric International Co., 40 Wall Street, New York 5, U.S.A.*

BREAKER REPLACEMENT TIMED IN MINUTES!

Standardization in Westinghouse Metal-Clad Switchgear pays off for you in greater flexibility, versatility, and service continuity! Breaker units, for example, are perfectly interchangeable—problems of matching mounting dimensions or aligning contacts are completely eliminated. And primary disconnects located on the main studs of the draw out units make inspection and maintenance convenient and quick. Write for "Booklet F" for complete details.

HERE'S BETTER PROTECTION FOR YOUR MOTORS AND OPERATORS

Westinghouse Life-Linestarters provide the most dependable and versatile control you can have for across-the-line starting of squirrel cage induction motors, or for primary control of wound rotor motors. Fast, positive operation and the exclusive Westinghouse "De-ion" arc quencher provide complete protection for motor and operator. Simplified installation and maintenance are insured by front-removable parts and straight-through wiring. For more information, send for "Booklet G."

YOU CAN BE **SURE**... IF IT'S

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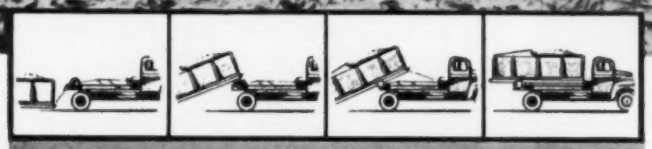
ONE FWD CAMPO SYSTEM TRUCK REPLACES 3 ORDINARY TRUCKS...SAVES YOUR MONEY!



ATTACH CABLE — SKID RISES — AUTOMATICALLY — IN FINAL POSITION

ALL IN LESS THAN ONE MINUTE!

If you want to haul more cane per day at greater savings, with no loss of time between trips, you need FWD's Campó system. You save not only the cost of the three ordinary trucks that one FWD Campó system will replace — you save fuel, licenses, parts, maintenance expense, and drivers' wages. You save time in the fields and at the mills. No waiting for skids or loading and unloading of trucks. Workers load extra skids at ground level in field while FWD hauls a Campó load and one or two Campalva trailers each way. Available in gas or diesel with FWD's famous traction and power for crossing cane fields in any weather. Start getting these extra savings *this* season by seeing your FWD Campó dealer right away. No other system saves you as much money!

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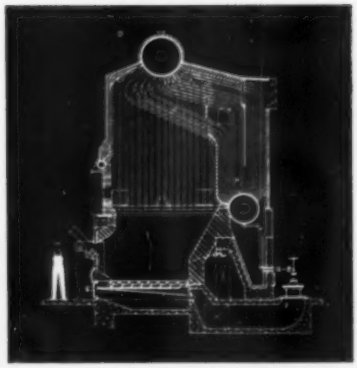
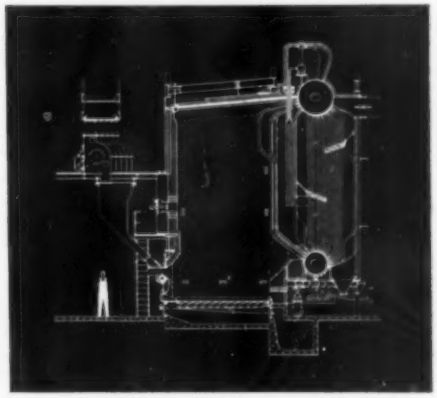
Such boilers, with a total capacity of more than 5,000,000 pounds of steam per hour, have been purchased for this service around the world.

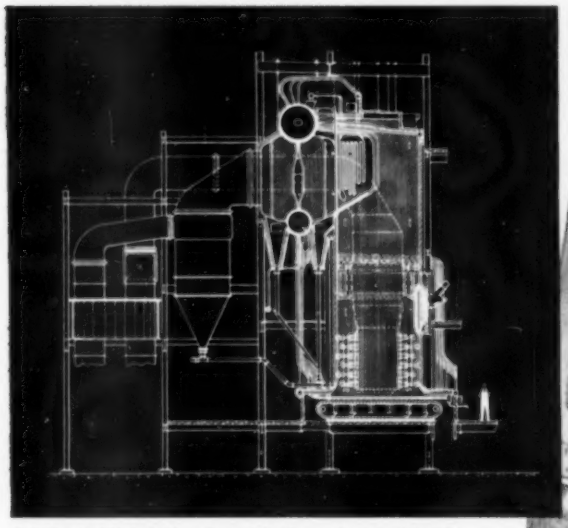
So—when you need equipment of this type buy from C-E, the company with extensive experience in your industry. Consult our representatives in your area, or our Export Department in New York.



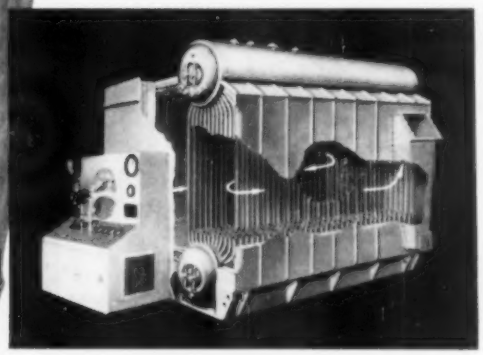
C-E Vertical-Unit Boiler, Type VU-10, equipped with C-E Bagasse Burning Stoker (Dump Grate Type). Units of this design are suitable for steam capacities up to about 45,000 pounds of steam per hour.



C-E Vertical Unit Boiler, Type VU-50, equipped with C-E Bagasse Burning Stoker (Dump Grate Type). This design is suitable for steam capacity requirements up to about 125,000 pounds of steam per hour.



C-E Vertical-Unit Boiler, Type VU-40, equipped with C-E High-Set Bagasse Stokers with continuous discharge traveling grate; tangential, auxiliary oil burners and tangential air admission are also employed. Especially suitable for steam requirements above 125,000 pounds of steam per hour.



C-E Package Boiler, Type VP. This oil or gas fired unit is especially suited for off-season and auxiliary steam needs. It is a complete, compact, shop-assembled boiler—simple and economical to install, operate and maintain.

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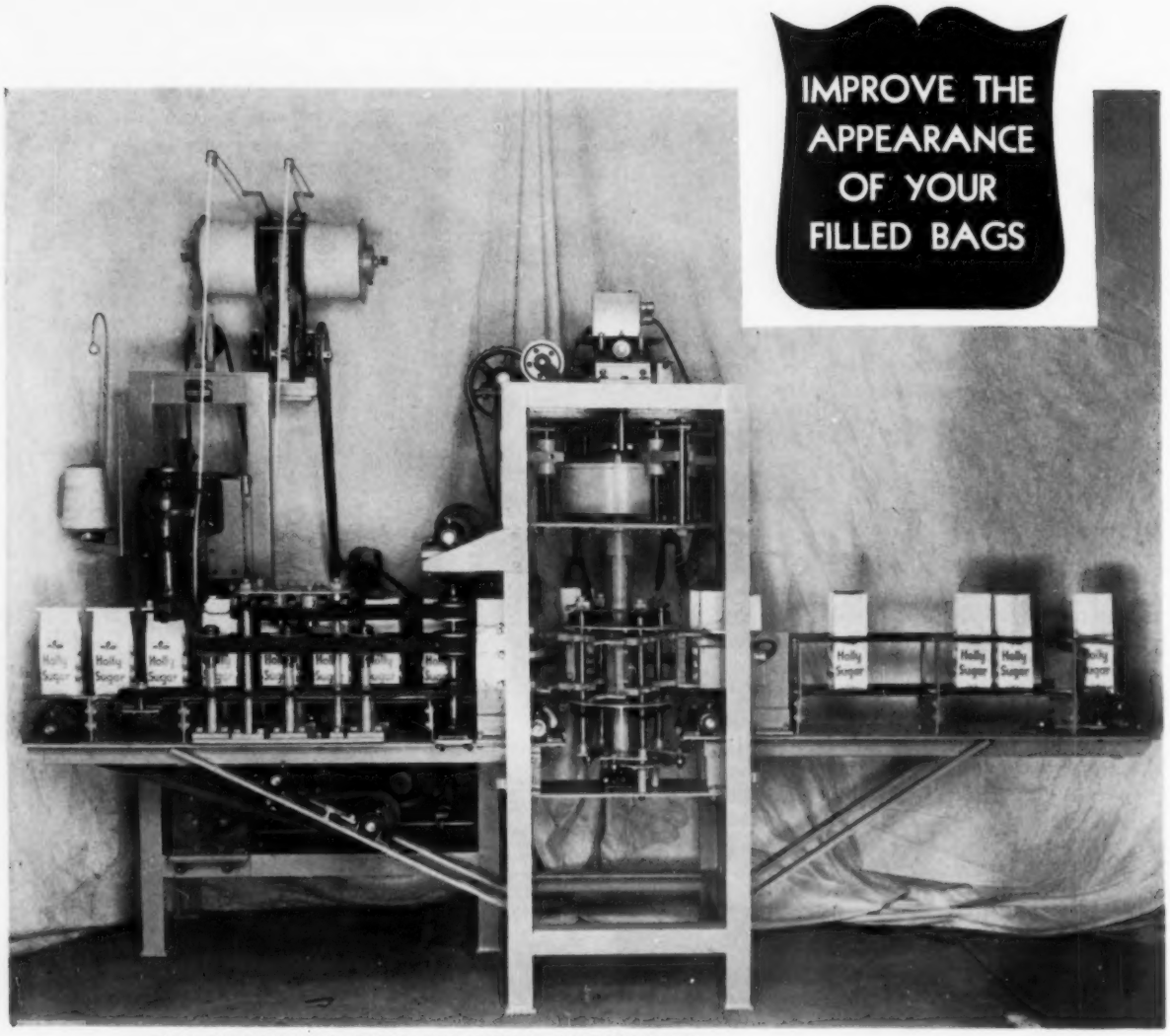
B-977

Combustion Engineering Building • 200 Madison Avenue, New York 16, N.Y.



THE MERRIFIELD TYPE 198 FULLY AUTOMATIC SPACING, FORMING, SHAPING & SEWING UNIT.

A fully automatic and positive means of forming, shaping, spacing and sewing small paper bags is provided in the Merrifield, Type 198 Automatic Sewing Unit.

This machine will receive filled bags from any type of scale or volumetric filler then form, shape, space and sew automatically.

Two conveying units, operating independently of each other, and a rotary bag spacer make up the elements of the Type 198 Automatic Sewing Unit. It is not necessary that the bags are properly spaced nor standing straight on the incoming conveyor.

The conveyor, feeding the filled bags to the rotary automatic bag spacer, runs continuously, supplying filled bags to the rotary spacing unit for proper and exact bag spacing. The rotary spacing unit then automatically places the filled bags on the second or outgoing conveyor belt which automatically forms, shapes and sews the filled bag. Each and every bag will be fed to the sewing head properly and exactly spaced, shaped and formed, also properly straightened in a true vertical position to give straight and smooth sewing across the top of the bag.

The second conveyor (outgoing conveyor) which automatically forms, shapes and sews the filled bags is timed with the rotary bag spacer and starts and stops with the rotary bag spacer. This action automatically starts and stops the sewing head.

The Automatic Sewing Unit can be equipped to form, shape, space and sew automatically any paper bag size from 2 to 10 pounds.

The standard sewing head used in conjunction with the Type 198 Automatic Sewing Unit is the Union Special Machine Company's style 60,000-D sewing head. This head automatically applies two strips of reinforcing tape, one to each side of the bag top, sews through both tapes and bag, trims the bag to form a neat upper edge and clips the tape between the bags. The sewing head can be adjusted vertically to accommodate the various bag sizes.

The Type 198 Automatic Sewing Unit is designed for ruggedness, compactness, and efficient operation with all electrical components being housed in steel cases. The unit can also be manufactured for explosion proof requirements.

The design, workmanship, and durability are in keeping with the standards established by J. D. Merrifield & Son.

J.D.MERRIFIELD & SON

ROCKY FORD COLORADO

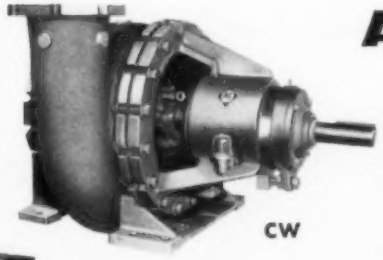
in Puerto Rico...

80%

of the pumps used in sugar mills are built by Allis-Chalmers

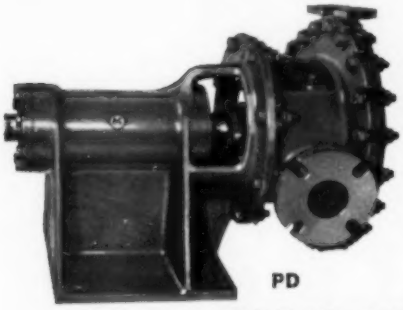
PW

The PW Pump for raw juice, maceration juice; for all installations where mechanical loading presents an abrasion problem . . . Handles 2 to 4% of sand or grit.



CW

The CW Pump for cachaza, "the pump killer," has a remarkable record for efficiency and minimum maintenance in this difficult service.



PD

The PD Pump used for syrup, milk of lime or juice; leakproof because it includes the *Equiseal* stuffing box and packing on the suction side.

Yes, eight out of every ten centrifugal pumps applied in Puerto Rico's vast sugar industry have been supplied by Allis-Chalmers. In fact, all of the island's million ton annual production goes through an A-C pump at some stage of the process. Such overwhelming preference is proof that sugar mill operators buy these pumps because they are built to operate continuously under the rigorous service demands of sugar production.

Allis-Chalmers will custom-assemble a pump from a wide range of metals and alloys designed to meet sugar mill needs. Contact your distributor for information or write Allis-Chalmers International, Milwaukee 1, Wisconsin, U.S.A.

Equiseal is an Allis-Chalmers trademark.

ALLIS-CHALMERS INTERNATIONAL

A Division of Allis-Chalmers Manufacturing Co.

A-5400

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These firms distribute equipment of the Company's Industrial, Power and Electrical, and General Product Divisions. Distributors of Tractor Group products also are located in principal cities.

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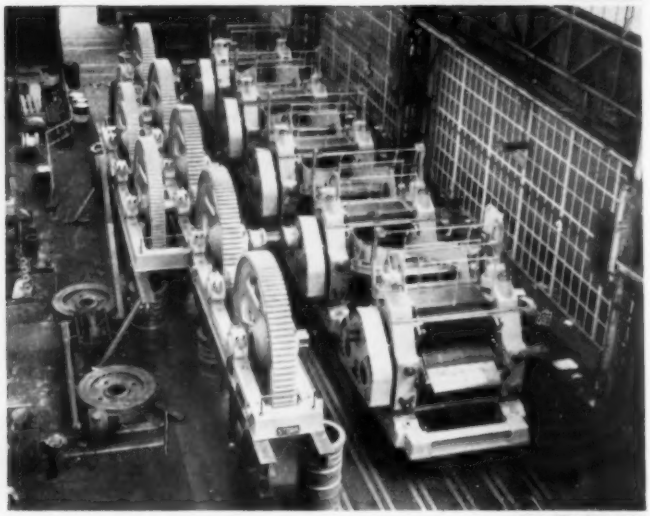
Beuduin

Your
complete
factory
from
cane
to
sugar



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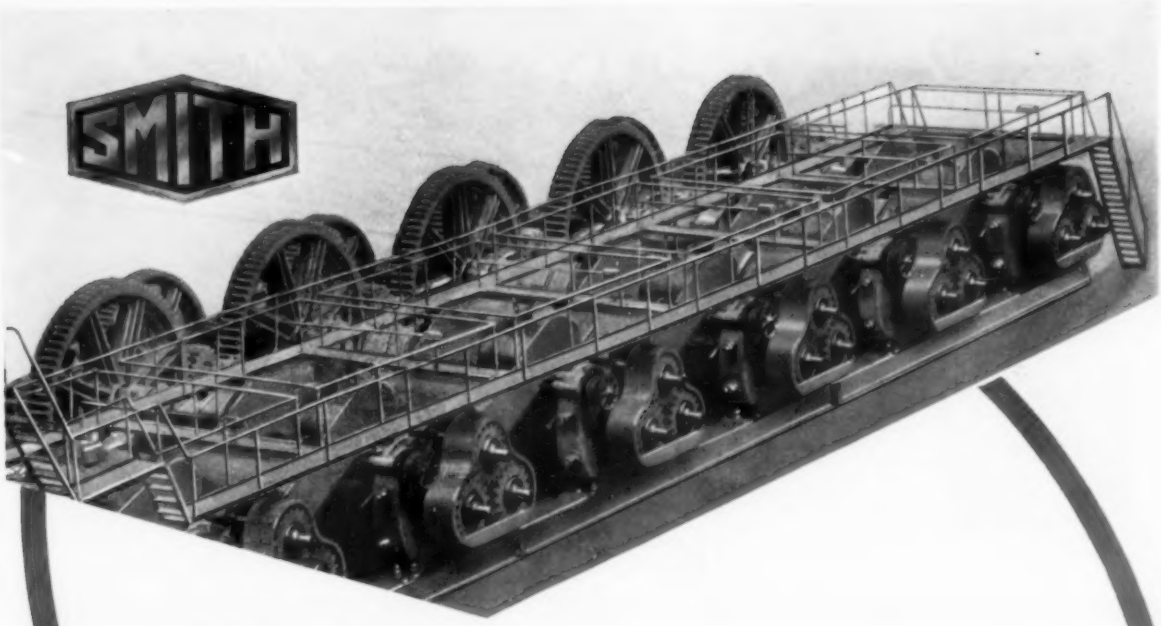
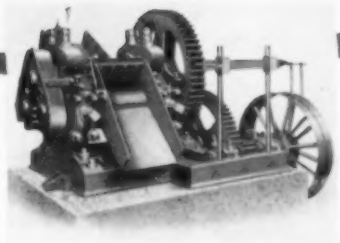


SUGAR MILL ROLLERS

FROM THE LARGEST
TO THE SMALLEST



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SUGAR FACTORY AND REFINERY ENGINEERS

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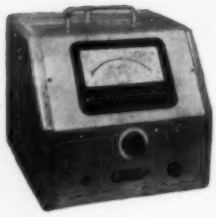
Cable Address: "SUGRENGINE LONDON"

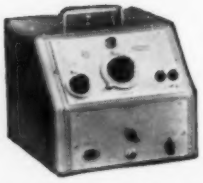
Works: 120 TRADESTON STREET, GLASGOW, C.5.

NEWTON (Sir Isaac)

read books on his
baac;
This awesome
depravity
Gave us the Theory of
GRAVITY



GENERAL PURPOSE pH METER
Cat. No. 11070
A simpler type of instrument with only one knob to set: covers 0-14 pH in one range: automatic temperature compensation.



AUTOMATIC TITRATOR
Cat. No. 11600
For quick and accurate routine titrations: designed to combine with a variety of pH, millivolt and conductivity measuring instruments. Can operate a wide range of reagent adding devices and give accurate control of dosing.

INDUSTRIAL pH AMPLIFIER 'H'
Cat. No. 11530
For stable measurement and control of process solution acidity and alkalinity.

Newton was one of the greatest scientific men that England ever produced. One wonders what he would have done had he lived today, with all the wonders of modern scientific instrumentation! Among these are Pye Scientific instruments. They're craftsman built, designed to meet the needs of research and industry and made to exacting standards which Sir Isaac Newton would have appreciated. Write to W. G. Pye for further information—you'll be very interested!

Please address complaints about this advertisement or requests for information on Pye Chemical or Physical Instrumentation to:

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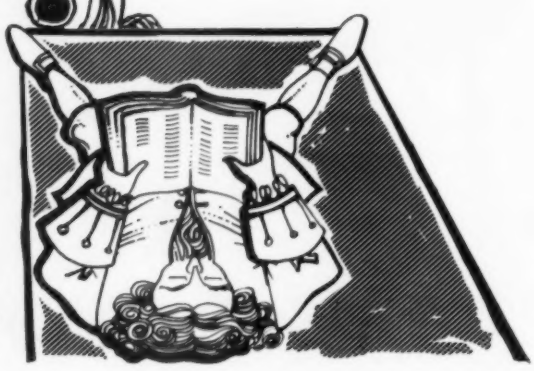
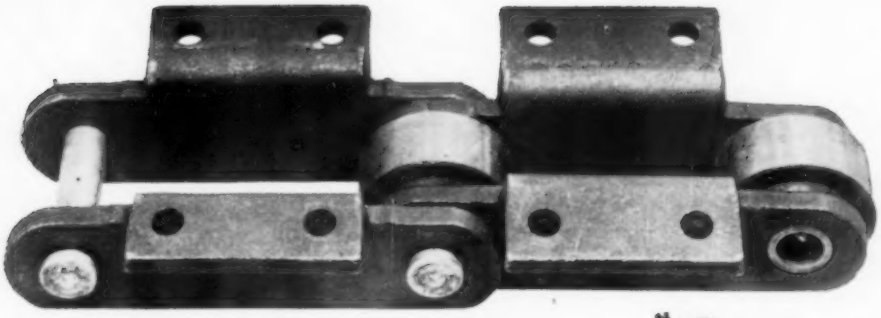
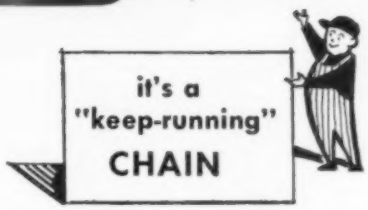
SCIENTIFIC PYE INSTRUMENTS







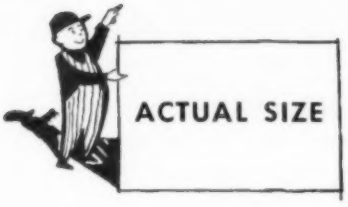
Insure with REX®

There's no better insurance against down time on your cane carrier than Rex A2800-K22. Strength—combined with Rex superior features—makes this 8" pitch chain the best for the heaviest of service in the largest mills.

Rex A2800-K22 is a "keep-running" chain. Quality design, quality materials, quality fabrication insure quality performance right through the last day of the grinding season.

The family of Rex Cane Carrier Chains also includes smaller sizes for lighter applications. Most—including A2800-K22—can be supplied with pressure lubricators in the pins.

For the best in all sugar mill chains—sprockets—slats—elevators—idlers, see your CHAIN Belt Distributor or write for Bulletin 52-71. CHAIN Belt Company, 4646 W. Greenfield Ave., Milwaukee 1, Wis.



CHAIN BELT COMPANY

Milwaukee 1, Wisconsin

S-A Speeds Sugar to Shipboard

General view of facilities at Port of Hilo, Hawaii.

STEPHENS-ADAMSON
Handling and Loading Equipment holds sugar cost down!

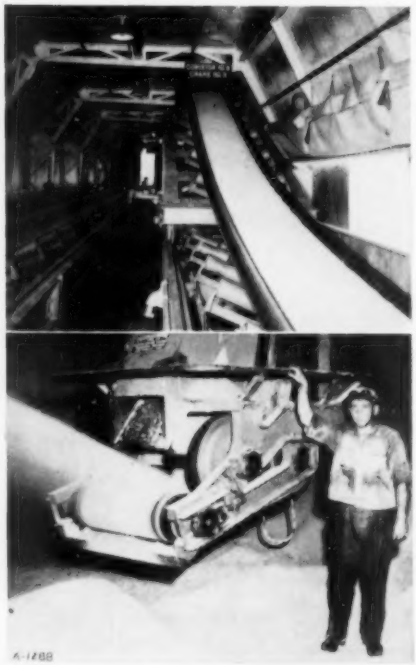
From the great Hawaiian sugar bowls at Nawiliwili, Hilo, Honolulu and Kahului, more than 1,000,000 tons of sugar annually are loaded aboard ships bound for the California and Hawaiian Sugar Refining Corporation, Crockett, Calif.

To keep handling costs where they belong, extensive STEPHENS-ADAMSON conveyor systems at all four installations, carry raw sugar to storage and shipboard with push button efficiency. Bulk handling the S-A way has resulted in container elimination, reduced maintenance, swifter, more effective ship loading.

Most important, mechanization of their handling problem has helped island growers tremendously to maintain their positions in the world sugar market.

More and more, competitive issues are being decided in bulk product markets by cost cutting methods. S-A engineering and planning is sharply attuned to this economy demand in the sugar industry.

Let us survey your present methods or future requirements. A STEPHENS-ADAMSON representative will be glad to show you how you can convey away your material handling problem.

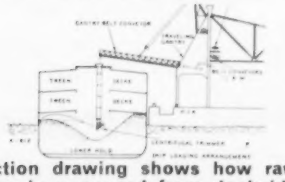


Top photo shows one of the two belt conveyors running parallel with dock. Belts are discharged by trippers to gantry conveyors—thence to chute in ship's hold.

Bottom photo shows S-A ship trimmer in operation. Sugar is distributed to furthest corners of ship's hold at over 350 tons per hr.

Diagram drawing shows partial conveying and storage facilities at Nawiliwili, Hawaii.

Sugar is carried from storage to dock at rate of 700 tons per hr. on a belt conveyor.



Section drawing shows how raw sugar is conveyed from dockside belt by gantry conveyor to centrifugal trimmer in ship's hold.

STEPHENS-ADAMSON MFG. CO.

56 Ridgeway Ave., Aurora, Ill.—Los Angeles, Calif.—Belleville, Ontario.

ENGINEERING DIVISION
Designers and manufacturers of all types of bulk materials conveying systems.

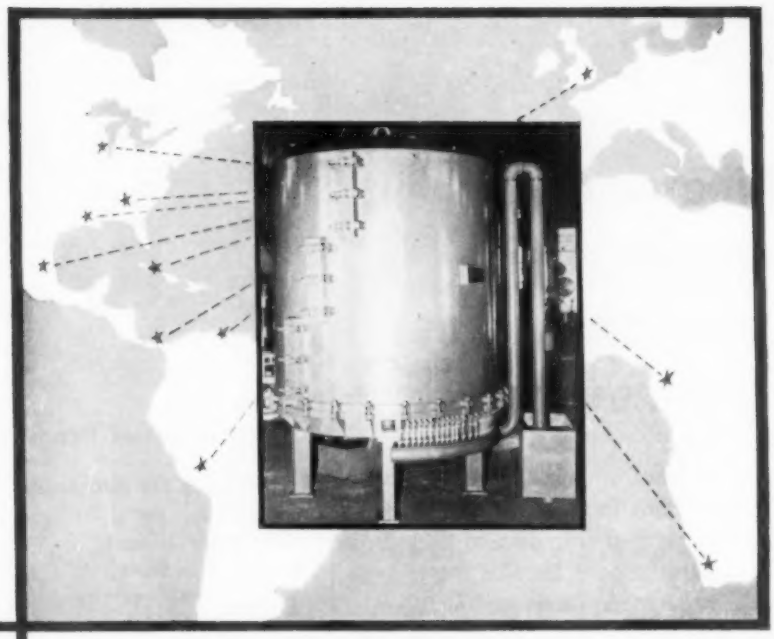
STANDARD PRODUCTS DIVISION
A complete line of conveyor accessories—centrifugal loaders—car pullers—bin level controls, etc.

SEALMASTER DIVISION
A full line of industrial ball bearing units available in both standard and special housings.

Check! ✓

these superior advantages...

- ✓ horizontal leaves filtering only on top surface
- ✓ no danger of cake falling off
- ✓ uniform cake thickness for fast, efficient sweetening-off
- ✓ separate outlet, shut-off cock and sight-glass for each leaf
- ✓ individual leaves can be removed independently
- ✓ filter cloths last 4 to 6 months—require no sewing
- ✓ 7-minute sluicing cycle with high-pressure jets
- ✓ no "blinding" of filter cloths
- ✓ filter remains **closed** during sluicing
- ✓ economical to operate—one man handles a complete station



SUCHAR FAS-FLO FILTER

TRADE MARK PATENT PENDING

...an improved horizontal-leaf pressure filter

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Suchar *FAS-FLO FILTERS* are already setting new production records in many corners of the world. From Louisiana to Peru, refinery management men and filter operators who recommended the selection of *FAS-FLO FILTERS* are getting daily proof of the soundness of their judgment.

For further details on how your operation can benefit by installing these revolutionary new filters, write or wire us today.

EXCLUSIVE SALES REPRESENTATIVES OF SUCHAR ACTIVATED CARBON FOR THE CANE SUGAR INDUSTRY.

Sugar mill at Chiclayo, Peru.

Insist on Worthington equipment —built specifically to meet the changing needs of the sugar industry

Steam turbine generators: Backed by more than 40 years' experience, Worthington steam turbine generators have continually proven their efficiency, reliability and economy. All Worthington turbines are sturdy straight-impulse design, and both turbines and generators meet NAEM standards. Standard sizes are available up to 12,500 kw and the turbine can be designed for any combination of inlet, extraction and exhaust steam conditions encountered in sugar mill practice.

Mill drive turbines: Worthington developed the modern mill drive turbine from turbine data and design resulting from 40 years' experience. Since their introduction mill drive turbines have become increasingly popular and are revolutionizing cane grinding practices. Worthington mill drive turbines, in single or multi-stage design, will provide excellent mechanical performance and many years of trouble-free service.

FREE! 2-color, fold-out chart shows typical applications of Worthington equipment in a sugar mill. For your copy, or for information on sugar mill equipment, write to Worthington Corporation, Department O.C., Harrison, N. J., U. S. A.

T57-1E

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The sign of value around the world

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- Power Engines
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- Compressors
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Products for the Marine Industry

This beet's going to get the Darco® treatment...

Beet condition is never a problem when using DARCO activated carbon. It assures high quality sugar that meets the most critical standards for color, odor, taste and uniformity. DARCO effects operating economies, too.

DARCO not only gives a better sugar, but reduces operating costs—speeds up evaporators and pans, improves centrifugal operation and increases slice.

DARCO activated carbon also offers many advantages in refining cane, corn sugar and glucose. Write for detailed information on how to apply the DARCO process profitably in your own plant.

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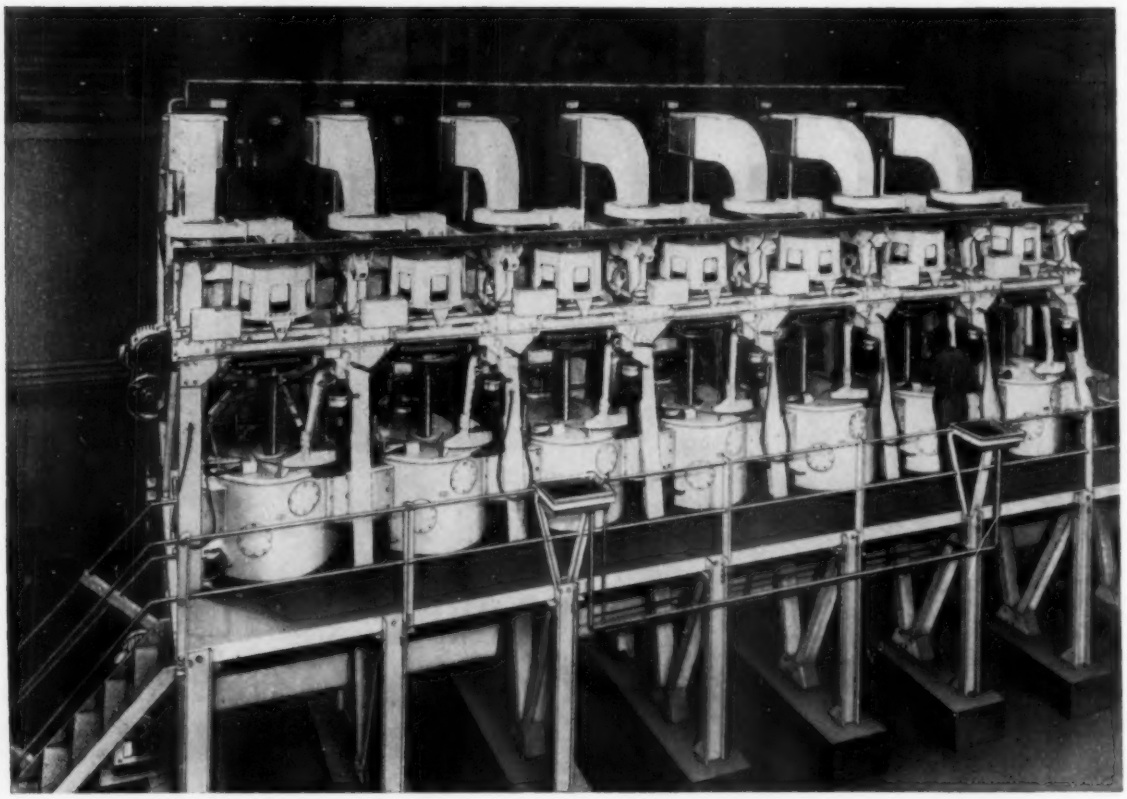


constant reliability + performance

When expanding, your first consideration is profit. Profit can only be maintained by installing centrifugals which ensure constant reliability and performance. These are two of the reasons why you should install BROADBENT.

In addition these centrifugals are powered by BROADBENT MOTORS designed for centrifugal duties and all accessories and controls are built to last, eliminating costly shut-downs. It is more profitable and easy to expand with . .

BROADBENT CENTRIFUGALS

THOMAS BROADBENT & SONS LTD., CENTRAL IRONWORKS

HUDDERSFIELD · ENGLAND · Tel: 5520/5. Grams: 'BROADBENT'

•Represented in most sugar producing areas

FALK Gear Drives help inaugurate modern era of sugar-mill efficiency

When Lula Factory began to convert to steam-turbine drive, ten years ago, it marked the beginning of a modern era in sugar production. The Lula installation demonstrated for the entire industry a new and better method of obtaining higher grinding capacities plus more efficient, more economical operation.

The Falk Corporation is proud to have furnished the new gear drives and shaft couplings for the Lula conversion. Prior to that time, Falk had supplied many large gears for sugar mill drives, also high-speed gear reducers for turbine applications in other industries...Since the Lula installation, we have furnished various combinations of gearing for other turbine-driven sugar mills. All are *precision helical gears* of highest mechanical efficiency (98½% per gear mesh under full load). And all afford the increased load-carrying capacity of the exclusive Falk extra-depth tooth form.

The performance of any sugar mill depends largely upon the reduction gearing. So, when you consider installing a turbine drive on an old or new mill, it will pay you to consult your Falk Representative, write us direct, or ask your mill builder or supplier to consult Falk.

○ GEARS—Single Helical or Herringbone

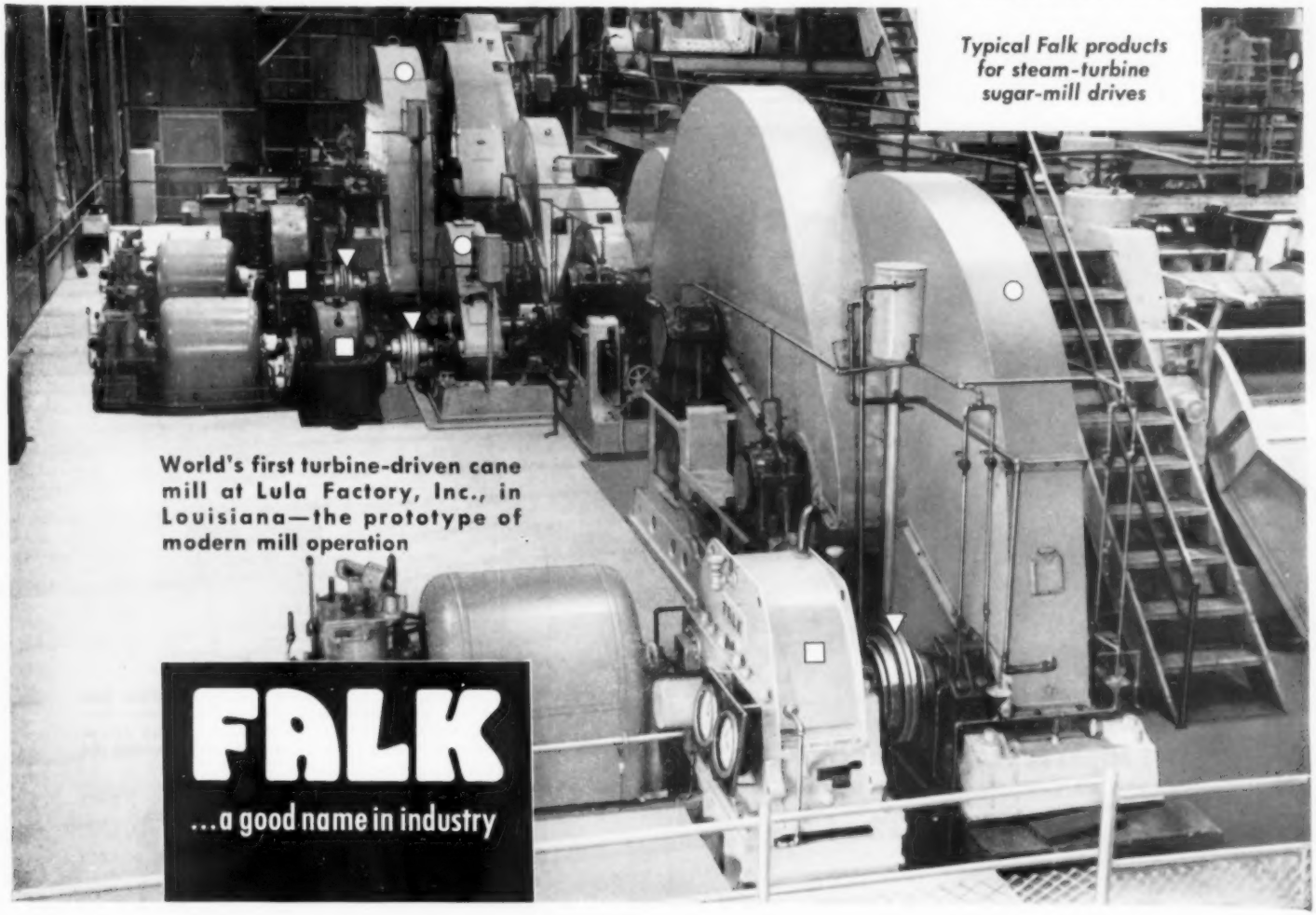
□ HIGH SPEED DRIVES

▽ STEELFLEX COUPLINGS

THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN

MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS

Representatives in many principal cities



Typical Falk products for steam-turbine sugar-mill drives

World's first turbine-driven cane mill at Lula Factory, Inc., in Louisiana—the prototype of modern mill operation

A PROVED* SUCCESS

'Mirrlees' STEAM TURBINES

for mill extensions and new factories

Extract from the Managing Director's Statement (16th August 1957) to the Shareholders of The Natal Estates Ltd. (Reproduced by permission)

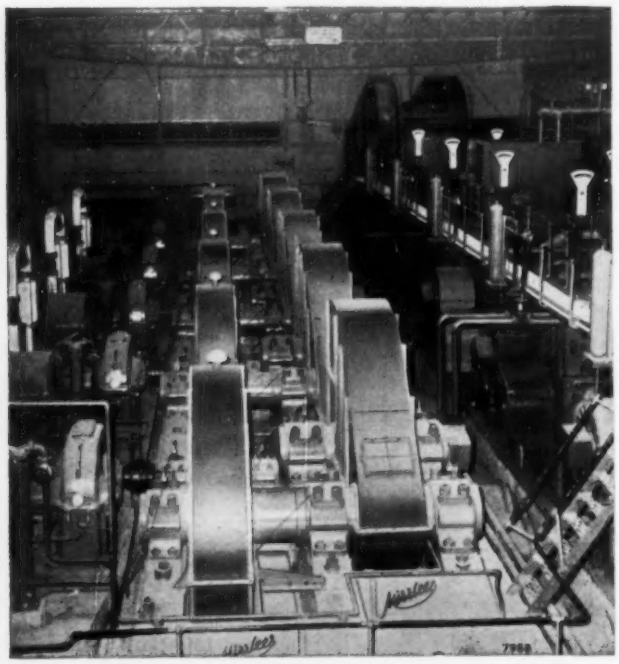
*The Crusher Turbine Drive replaces the electric drive supplied by MIRRLEES in 1934.

*

The mill extraction figure recorded 93.71 per cent. in 1956 and as envisaged in my statement last year, practical steps have now been taken to improve milling results by the installation of a steam turbine driven sixth milling unit, thus increasing the milling train to one of 21 roller (including the crusher). A flexible steam turbine drive has also been installed to operate the front crusher unit and will add to the general efficiency. These new units which were brought into service on 8th. May, 1957, are operating satisfactorily and have increased the mill extraction for the current season up to the time of writing to 94.80 per cent. compared with 93.71 per cent. for the corresponding period in the 1956 season.

This is only one of the many successful installations using Mirrlees Steam Turbines—and more recent figures show even greater improvement:

	BEFORE—WEEK ENDING 27/10/56	AFTER—WEEK ENDING 26/10/57
TONS CANE CRUSHED PER HOUR	158.95	168.35
INBIBITION % CANE	37.5	33.29
FIBRE % CANE	16.13	16.96
MILL EXTRACTION	93.8%	95.16%



Extract From "New Commonwealth"

Ceylon's first sugar cane factory

Colombo.

THE Ceylon Gal Oya Development Board recently signed a contract with the Mirrlees Watson Co. Ltd., a Scottish firm, totalling Rs. 19 million for the construction of the first sugar cane factory in the island. Under the terms of the contract the firm will construct the buildings, supply the machinery and install it in conjunction with its local agents, Brown & Co. Ltd. Local industrialists believe that the Government could not have made a better choice in handing over the contract to the Mirrlees Watson Co. Ltd. because of its experience and record in sugar cane machinery. The company has equipped several factories throughout the world, including no less than 50 in India where its operations began in 1874.

MIRRLEES are the only British makers of Sugar Machinery who also design and manufacture Steam Turbines for Mill Drives. Over 40 Mirrlees Turbine driven plants are operating with good results throughout the world.

TAKE ADVANTAGE OF THIS UNIQUE EXPERIENCE. SPECIFY MIRRLEES STEAM TURBINES FOR MILL DRIVES.

THE MIRRLEES WATSON COMPANY LIMITED

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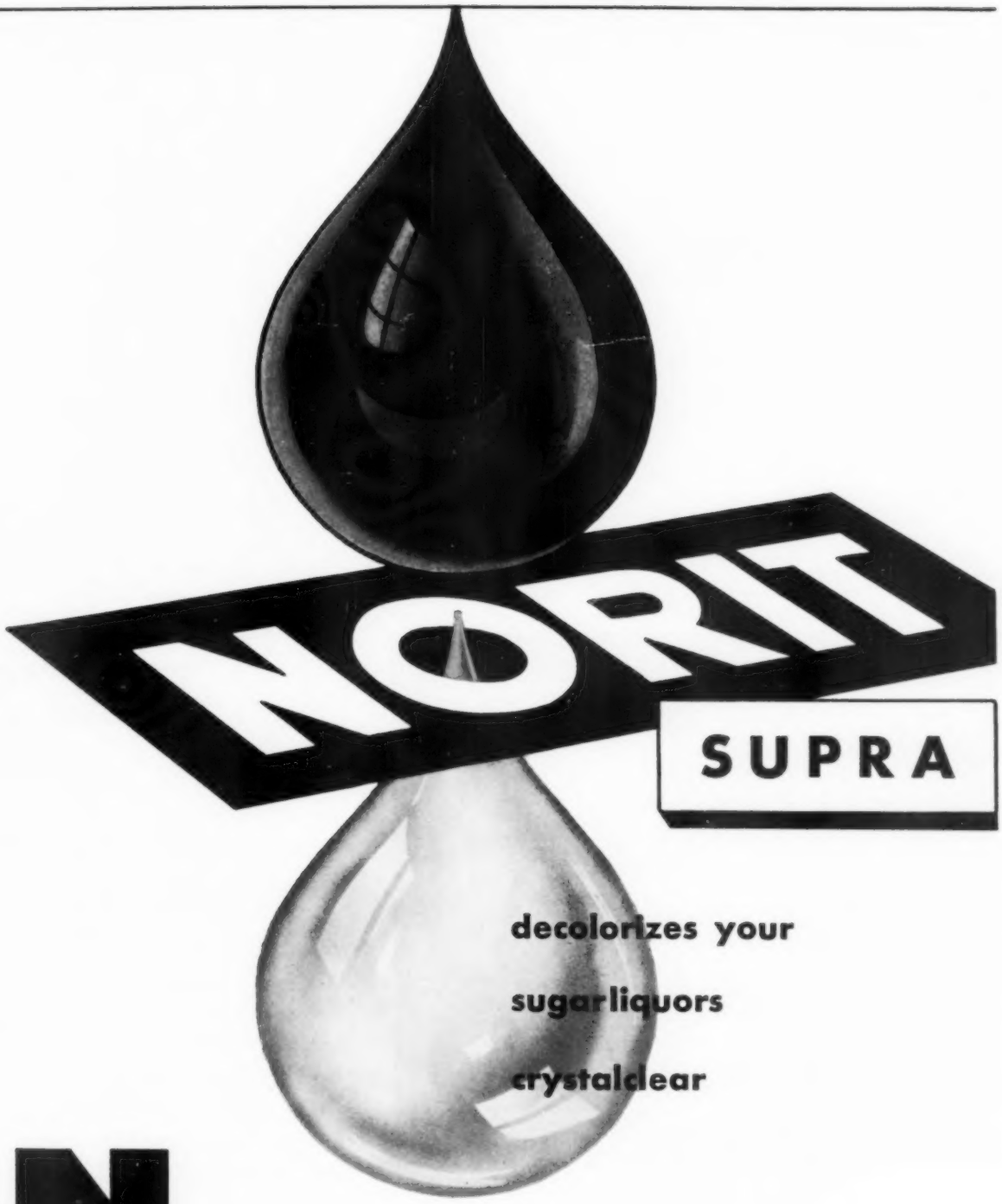

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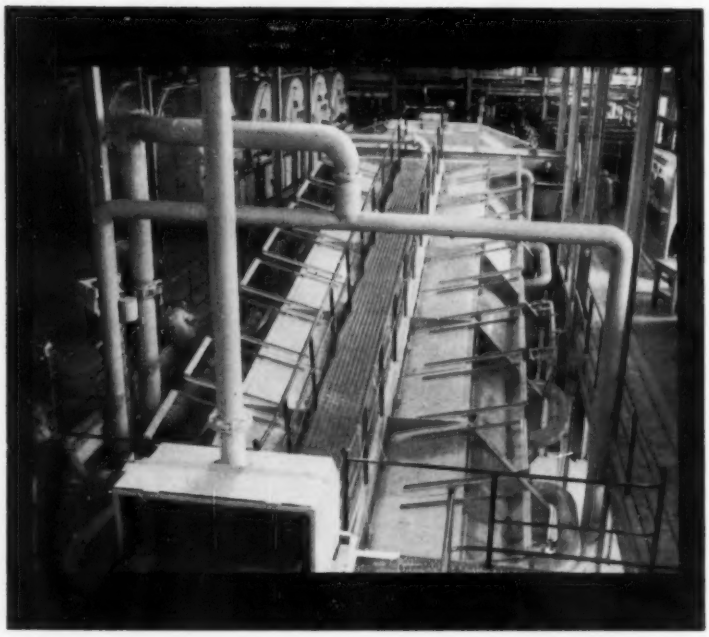

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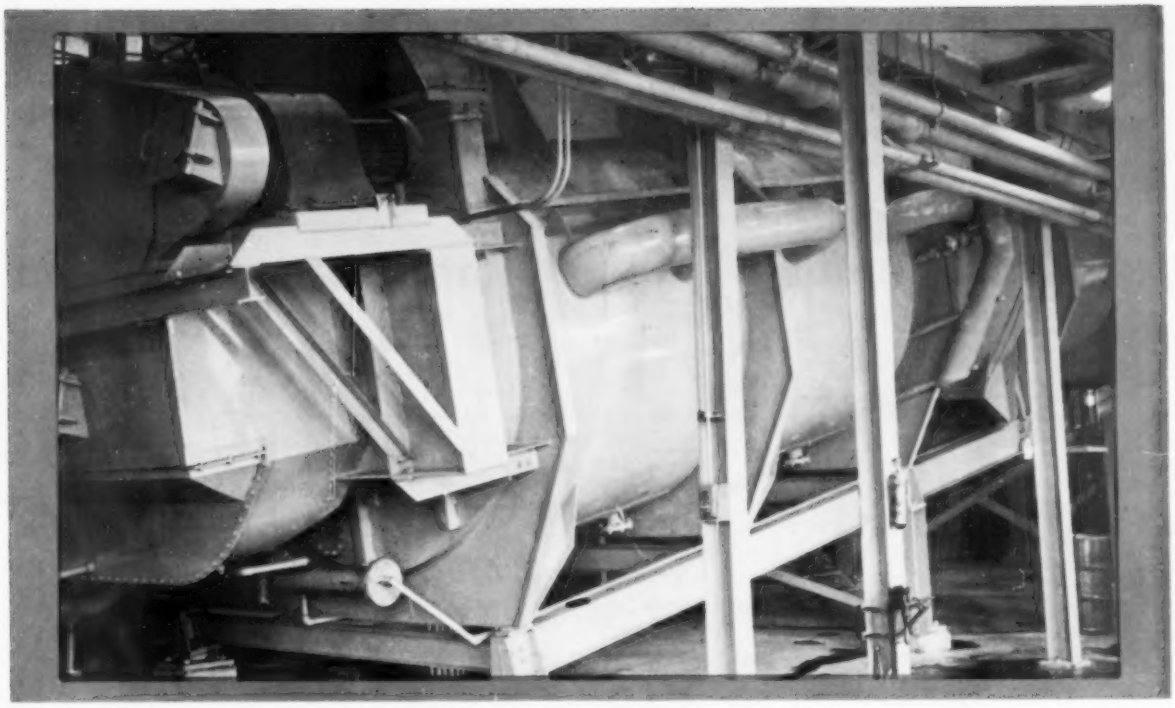

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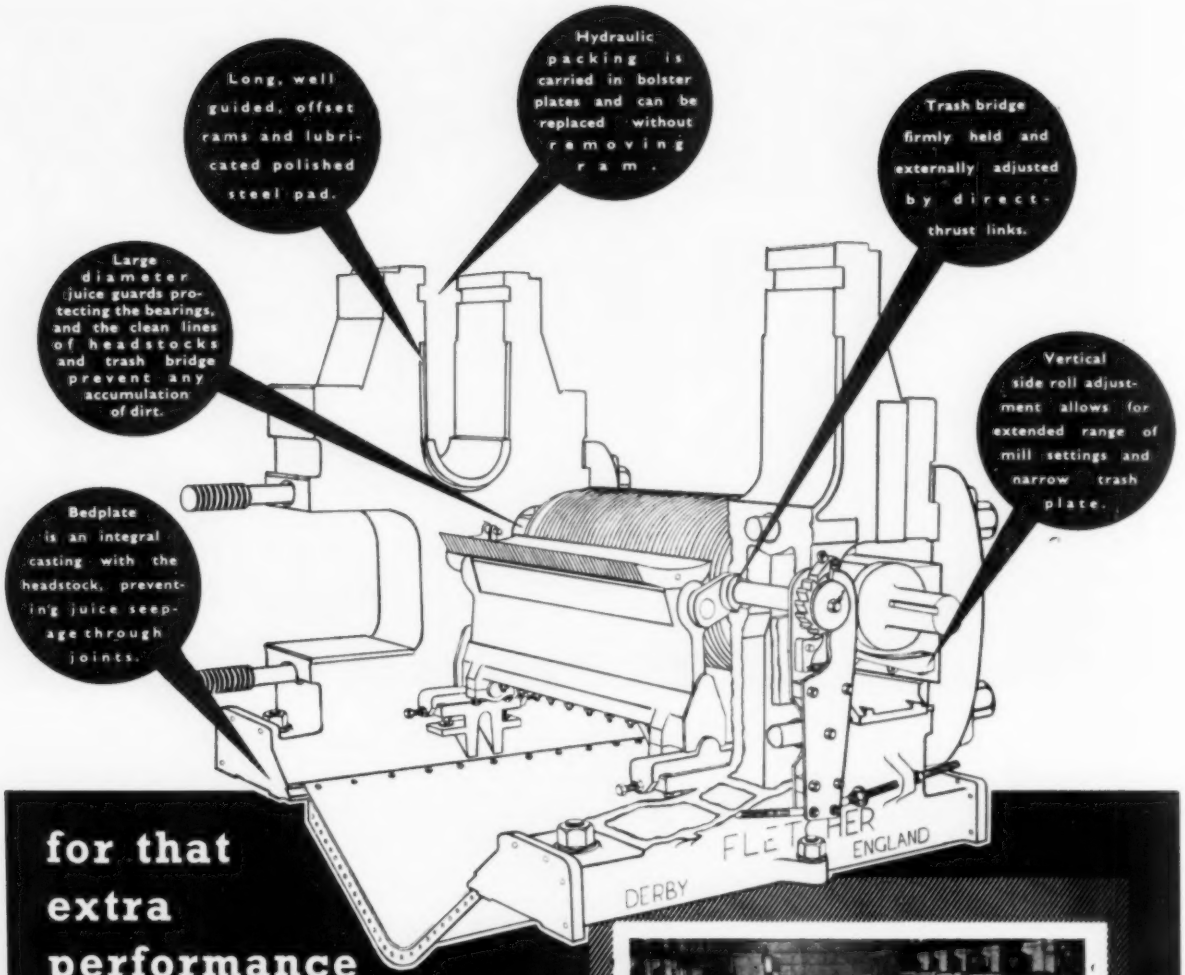

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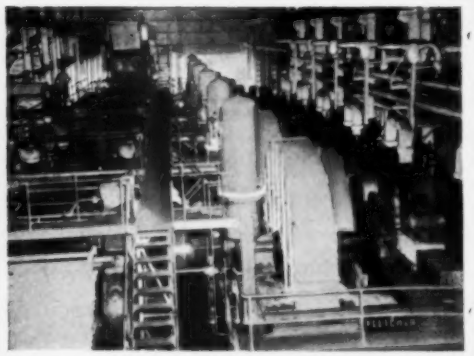

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SUGAR

FEBRUARY, 1958

Beet Technologists Confident of Continuing Progress

It began 23 years ago in Fort Collins, Colo., as a "sugar beet round table"—a gathering of a few sugar beet experts from Rocky Mountain states.

This year it will foster the world's largest international meeting of sugar beet scientists—February 3 to 7 in Detroit, Mich.

"It" is the American Society of Sugar Beet Technologists, the only technical society of its kind in this country devoted to a single crop. The Detroit conference, the Society's 10th biennial general meeting, is expected to attract more than 500 sugar beet experts from the United States, Canada and four or five European nations.

Some 150 papers in six broad fields will be presented by scientists and technicians from federal and state governments, universities, and the beet sugar industry. Speakers will report on the latest developments in all phases of sugar beet agriculture and beet sugar factory operation.

According to Austin Armer, the Society president, discussions will deal not only with major problems currently concerning the industry but also on research projects aimed at increasing still further the industry's already highly efficient production.

An awareness of the atomic age and unsettled world conditions is also indicated by the program. The opening general session will include an address by Dr. W. Ralph Singleton, world-renowned professor of biology of the University of Virginia, on uranium and cobalt radiation as related to genetic improvement of crop plants. At the same session, Dr. Paul A. Miller, director of the Michigan State University extension service, will discuss the present world situation's impact on biological research.

Armer pointed out that the significant gains made by the beet sugar industry in recent years may be paled by advancements promised by projects now in the research laboratories and green houses.

He cited the mechanical revolution in American sugar beet fields since the end of World War II, resulting in complete mechanization of the harvest and conspicuous reduction of hand labor at other seasons. Man-hours required to produce enough beets for a ton of sugar have been reduced by one-third in the past ten years. Average sugar beet yields per acre have been increased from 13.4 tons in 1948 to 17.4 tons in 1957.

"Developments in many fields, which will be discussed at this meeting, provide a solid basis for optimistic forecasts concerning still greater progress for the American beet sugar industry in the years ahead," the Society president said.

Among these developments Armer listed the production of commercial hybrid and monogerm sugar beet seed, the expanding use of chemical weed-killers, the invention of new and improved machinery for sugar beet fields, and progress in the never-ending battle against insects, soil pests and plant diseases.

Sectional conference groups at the meeting will be concerned with these six general fields—(a) agronomy, (b) genetics and variety improvement, (c) entomology and plant pathology, (d) agricultural engineering, (e) chemistry and factory operation, and (f) physiology.

Specific subjects expected to attract special interest include the following:

Gibberellic acid in seed production: As announced recently by the U. S. Department of Agriculture, scientists have found growth-regulating giberellic acid of possible use in commercial production of seed for bolt-resistant varieties of sugar beets. Such seed cannot be produced economically by commercial methods commonly used in the United States now, and so this development is of great importance. Various phases of gibberellin research will be described in 10 papers to be presented in the physiology section meetings.

Nematodes: Included among papers on projects seeking control of this pest will be reports on research involving crosses with wild sugar beets—aimed at producing beets which will kill rather than nourish nematode larvae.

Disease control: A variety of reports will be given on projects directed toward combating virus yellows, beet ring mottle, curly top and other diseases to which the sugar beet is subject.

Hybrid and monogerm seeds: Latest developments in this field, from which dramatic yield increases and labor reductions are foreseen, will be reported.

Mechanization: Details will be given on results obtained with mechanical improvements and new machines, from planters to harvesters, designed to reduce still further the man-hours required for sugar beet production.

Chemical weed control: This subject, which also has a direct bearing on the goal of eliminating hand labor from the sugar beet fields, will come in for thorough discussion.

Sugar beet breeding in Europe: Methods currently prevailing in both East and West Europe will be described by on-the-spot observers.

Although the specific subjects naturally have changed through the years, papers to be presented at this year's meeting are typical—in scope, importance and scientific thoroughness—of discussions presented at all previous meetings of the Society.

Formal organization of the American Society of Sugar Beet Technologists at Salt Lake City in January, 1938, was a direct result of the "sugar beet round tables" held the previous three years at Fort Collins, for the Colorado State College of Agri-T. G. Stewart, then extension agronomist culture, is credited with initiating the first meeting in 1935 and, along with C. V. Maddux, taking an active part in organizing and conducting all three round tables.

California sugar beet scientists were invited to take part in the third round table session, in 1937. At this meeting, in fact, most of the sugar beet areas and research institutions interested in sugar beets in both the United States and Canada were represented. The decision then was made to form a permanent organization, and the Society was officially created the following January with adoption of a constitution and by-laws at the first general session.

Active participation of Canadian sugar beet scientists has been marked from the beginning. The Society's present membership of 560 includes members in 20 foreign countries. The quarterly *Journal*, which publishes the papers presented at the Society's meetings, has subscribers in 45 foreign countries. In addition, the Society, from its headquarters office at Fort Collins, corresponds with experts in the field throughout the world.

General sessions have been held every two years since 1938 with the exception of 1944, when the biennial meeting was cancelled because of World War II. In

(*Continued on page* 32)

MARKETING ABILITY
of The Beet Sugar Industry

At the Twelfth Annual Meeting of the National Beet Growers Federation in Salt Lake City on December 4th, Douglas W. Love, vice-president and general sales manager of the Utah-Idaho Sugar Company, presented an address on the vital subject embodied in the title of this article. In the words of Douglas Scalley, executive vice-president and general manager of Utah-Idaho:

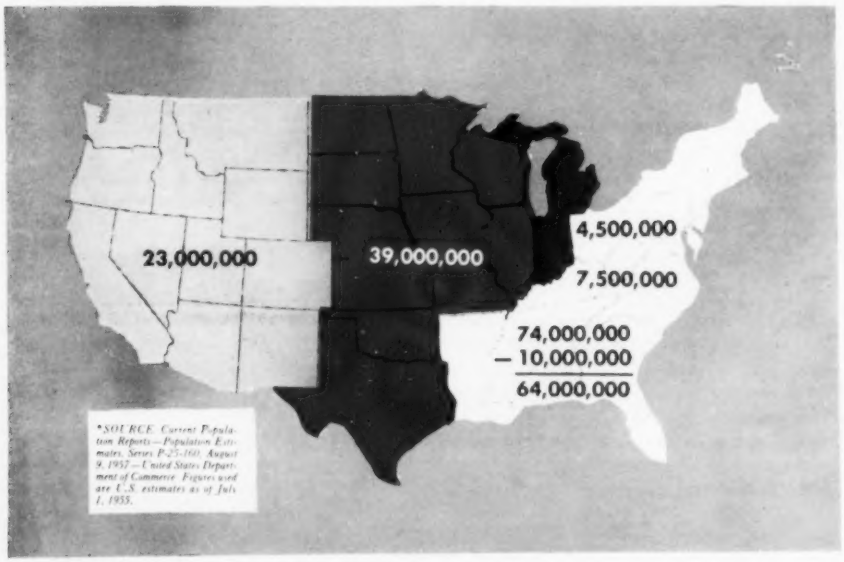
"We believe this document represents a major contribution to the philosophy and long-range thinking of all of us who are concerned with the successful future of the beet sugar industry of the United States. Particularly does this presentation bear out our point of view that within the normal marketing territory of the beet sugar industry there is now, and will continue to be long in the future, an ample market potential for our industry's increasing productivity made possible under terms of the Sugar Act as amended in 1956."

Fully cognizant of the importance of this study, it is a privilege to reproduce it here in abbreviated form, particularly appropriate as coinciding with the Tenth General Meeting of American Society of Sugar Beet Technologists.—*Editor.*

"In the past ten years," said Mr. Love, "tremendous progress has been made in the production of sugar beets and beet sugar." Having outlined some of these advances, Mr. Love continued, "The accomplishments of the past have put us in a position where the future will be determined by understanding and the wise use of our ability to produce and market." In this connection, Mr. Love pointed out, the beet sugar industry's future is geared to its ability to market; and there is a real job ahead for those who are concerned with sales but, he contended, that not only is it possible for the industry to develop the needed market but that the marketing problem is the most exciting challenge before beet producers today.

Starting with 1949 distribution of 7,600,000 short tons raw value as being then approximately normal, Mr. Love suggested adding an assumed annual increase of 150,000 coming largely from population increase. This formula indicates a distribution of 8,800,000 tons in 1957 which gives us a check-point and forecasts 9,250,000 tons by 1960. The Department of Commerce estimates that population will reach 178.5 million by 1960. That number, at an annual consumption of 97 lbs. of refined sugar *per capita* will consume 9,263,258 tons, raw value, so the first formula, suggested by Mr. Love, seems reasonably accurate and conservative.

Starting from this formula, Mr. Love reasoned that the beet quota in 1960 would be 2,010,000 tons exclusive of any deficits from other supplying domestic areas. Our job, he said, was to attain the market level of 2,010,000 by 1960, the final year of the Sugar Act and thus establish a position capable of marketing an increasing share of the total under whatever provisions are written into the law after 1960.



Mr. Love concerned himself mainly with sugar produced in the west. Most of the eastern beet sugar, he pointed out is grown and sold in Michigan, Ohio, and Wisconsin. The normal market for western beet sugar consists roughly of the 11 western states, the 11 border states, part of Indiana and part of Michigan. However, inside that area there are sections where freight costs are so great that they are not generally thought of as part of the western beet normal market. Those sections are in Texas, Oklahoma, Indiana, and Michigan.

By reference to the accompanying outline map, it will be noted that in 1955 there were 23 million people in the 11 western states; 39 million in the 11 border states; 4.5 million in Indiana; and 7.5 million in Michigan. To adjust these figures to coincide with western beet marketing area, 10 million people who live in those parts of Texas, Oklahoma, Indiana, and Michigan beyond economical freight distance, should be eliminated. The beet sugar market in 1955 contained about 64 million people. Using Department of Commerce figures, the population of that area will increase to 71 million people, the population to which western producers must sell their share of the total beet quota of 2,010,000 tons or 37.6 million hundred-pound bags. Eliminating the three million bags that will be produced in Michigan, Wisconsin, and Ohio and sold outside the normal market for western beet, there will remain 34.6 million bags to sell to about 71 million people. At the normal rate of *per capita* consumption of about 96 pounds of refined sugar, 71 million people will use 68 million bags of sugar; hence, if the western beet industry obtains slightly over 50% of the potential business in their normal marketing area, they will dispose of their full share of the 1960 marketing allotment.

Mr. Love, having presented the foregoing calculations supported by more detailed tables of figures and additional charts, pointed out:

"In 1956 western beet sugar accounted for 49% of the total sugar sales in that market; made up of 61% in the 11 western states and 42% in the 11 border states. It is apparent from these facts that an adequate market is available to us, not only for the increased allotment which will accrue under the 1956 amendments to the Act, but for the increase which will come when the Act is extended beyond 1960."

Mr. Love referred to the continuing west-

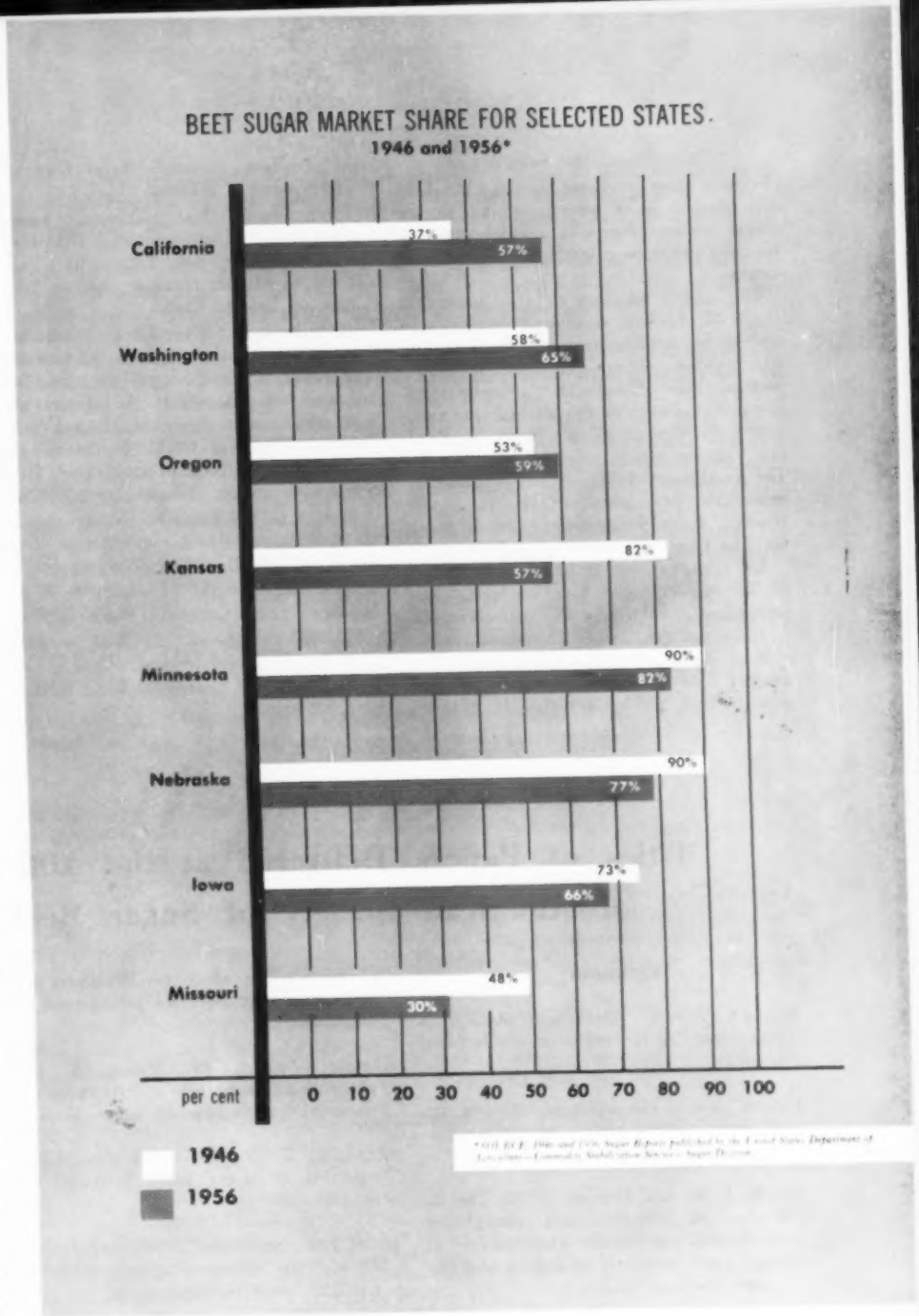
ward movement of population indicating that another 14.5 million people will be added to the normal marketing area between 1960 and 1970 providing a potential market for western beet sugar of 85.5 million people.

"From these calculations," said Mr. Love, "based on responsible forecasts of population change and growth, I am unable to resist the conclusion that doubt of our future marketing ability has come from pessimistic rather than logical thinking. There is not only room for us to sell our increasing production in our traditionally normal market; but we should be able, by intelligent use of our abilities, actually to reduce our high freight cost territory; and still leave room for other claimants to share the business, and maintain positions which are proper under the Act."

This market will certainly not fall into the laps of the western beet industry. It can be captured and held only by aggressive and intelligent selling. Said Mr. Love:

"To bring these things more clearly into focus I will particularize. . . . The operation of Western Beet Sugar Producers Association should be continued and expanded and used to its fullest ability to increase the acceptability of beet sugar and to promote public understanding and regard for the beet sugar industry. WBSP can contribute the background against which companies can conduct and improve their sales, but the real job of selling is a company job. Much progress has been made in the last few years in brand selling. Packaging has been greatly expanded and improved. We have achieved better uniformity of grain size, better color and appearance of the sugar that goes into our grocery packages. Several companies have developed effective brand promotion programs that are producing gratifying and important results. In many markets today our package lines are displayed in mass and find ready acceptance in competition with other sugars.

"We have made giant strides in bulk handling methods. Beet sugar now moves to market in tote bins, tank trucks, tank cars, hopper-bottom and airslide cars, in liquid and bulk form, and is put to the customers point of use by means of air or mechanical conveyors. Recently devices have been perfected to convert dry sugar to liquid as it is unloaded from truck or car at the user's plant, thus eliminating the costly transportation of water but giving the industrial users all the advantages of liquid sugar. Speciality sugars to fit specific industrial uses have been perfected. But there is much still to be done. Our sales forces need to be increased and better educated. Men who understand modern merchandising must be found, or developed amongst our own people. Advertising must be done continuously and intelligently in those areas where we can afford it and where our strong selling points can be exploited effectively."



One objective that Mr. Love stressed was to capture a larger share of beets' home state market. He pointed out that in seven states—Colorado, Idaho, Montana, Wyoming, North and South Dakota, and Utah, more than 85% of the total sugar used is beet sugar. On the other hand in California, Washington, and Oregon, less than 60% of the sugar used is beet sugar. Any reasonable approach to the level reached in some states will open a tremendous new market and at high net returns.

Mr. Love pointed out some of the progress that has been made in the direction of increasing beet sugar distribution in beet producing states as indicated by the accompanying chart.

"We need to recognize and understand the changes in the use of sugar industrially," said Mr. Love, "both the trend to greater industrial use as compared to household use and the irresistible movement toward mechanical handling. There must be more bulk facilities at the factories and there must be bulk distributing terminals in the areas of large industrial use. This requires invention and investment, courage and know-how. . . . Soon we must find a way to deliver bulk sugar to less than car-

(*Continued on page 35*)

(*Continued from page* 29)

alternate years, regional meetings are held —conducted on a pattern similar to the larger sessions but with special attention given to problems principally of a regional nature.

The active manager of the Society is James H. Fischer, secretary-treasurer, who directs the headquarters staff at Fort Collins. Other officers are the president, Austin Armer, Woodland, California, agricultural engineer for Spreckels Sugar Company; the vice president, Frank N. Rawlings, Ogden, Utah, research director for The Amalgamated Sugar Company; and the immediate past president, P. B. Smith, Denver, Colorado, general agriculturalist for The Great Western Sugar Company.

An advisory council has representatives of all major sugar beet producing and processing areas of the U. S. and Canada. Regions and their council members are:

West Coast—C. W. Bennett, superintendent, USDA experiment agriculture station, Salinas, California; Guy D. Manuel, vice president, Spreckels Sugar Company, San Francisco, California.

Intermountain—Bion Tolman, general agricultural superintendent, Utah-Idaho Sugar Company, Salt Lake City, Utah; Harold E. Ellison, manager, Layton Sugar Company, Layton, Utah.

Eastern slope (of the Rocky Mountains) —E. H. Hungerford, director of research, The Great Western Sugar Company, Denver, Colorado; Harvey P. H. Johnson, general agriculturist, American Crystal Sugar Company, Denver; C. M. Nicholson, vice president and director of agriculture, Holly Sugar Corporation, Colorado Springs, Colo.

Eastern U. S.—Grant Nichol, agronomist, Monitor Sugar Division of Robert Gage Coal Company, Bay City, Michigan; M. G. Frakes, agricultural research director, Michigan Sugar Company, Saginaw, Mich.

Eastern Canada—C. A. Neil, assistant agricultural superintendent, Canada and Dominion Sugar Company, Ltd., Wallaceburg, Ontario.

Western Canada—Wesley Smith, agronomist, Canadian Sugar Factories, Ltd., Taber, Alberta.

Council members at large—Lyman Andrews, southern district manager, The Great Western Sugar Company, Denver, Colorado; Vernal Jensen, general agriculturalist, The Amalgamated Sugar Company, Ogden, Utah.

As expressed in its constitution, the principal objective of the Society is "to foster all phases of sugar beet and beet sugar research, and to act as a clearing house for the exchange of ideas resulting from such work."

It is more than coincidental that the period during which the Society has been actively fulfilling that objective is the period during which the beet sugar industry has made its greatest progress.

The Society's current 10th biennial general meeting at Detroit will present ample evidence that progress in the future may be even greater.

Titles of Papers Delivered at the 10th General Meeting of American Society of Sugar Beet Technologists

Agronomy

Haddock, Jay L. Yield and quality of sugar beets as affected by available plant nutrients.

Tolman, Bion. The effect of nitrogen applications on the yield and sucrose percentage of sugar beets.

Burtch, L. M. and Duncan, R. B. The influence of nitrogen and phosphorus fertilization on yields and quality of sugar beets harvested in August and November in Kern County.

Ogden, D. B., Finkner, R. E., Olson, R. F., and Hanzas, P. C. The effect of fertilizer treatments upon three different varieties in the Red River Valley of Minnesota for: I. Yield, sugar content, purity, and nonsugars.

Finkner, R. E., Ogden, D. B., Hanzas, P. C., and Olson, R. F. The effect of fertilizer treatments upon three different varieties in the Red River Valley of Minnesota for II: Calcium, sodium, potassium, raffinose, galactinol, nine amino acids, and total amino acid content.

Berrett, Mark R. Sugar beet yield as influenced by preplanting fertilizer application.

Dubetz, S. The effect of fertilizers and osmotic pressure on the germination of sugar beets.

Russell, Glenn C. and Dubetz, S. The effect of different levels of fertility on the chemical composition of sugar beets.

Shepherd, L. N. The sodium-potassium nutrition of sugar beets produced on organic soils.

Davis, J. F., Sundquist, W. B., and Frakes, M. G. An economic optima study of fertilizer usage on sugar beets.

Guttay, J. R. Sugar beet production in Michigan as affected by cropping sequence and fertility level.

Johnson, Richard E. Two years results of spacing studies on 30-inch single rows in California.

Steck, Ronald D., and Rudolph Gordon. Three years data on relationship of row widths, spacing, and yield.

Johnson, R. T. and Burtch, L. M. The wild beet—a new weed problem.

Switzer, C. M. Chemical weed control in sugar beets.

Nelson, R. T. Results with several herbicides tested on sugar beets in small plots at Longmont, Colorado.

Nelson, R. T. and Wood, R. R. Weed control results from strip tests with Dalapon, DCU, Endothal, and TCA.

Eckroth, E. G., and Cormany, C. E. Chemical control of annual grasses in sugar beets.

Wheatley, G. W. and Johnson, R. T. The effects of mechanical processing, some seed treatments and storage on the germination and emergence of sugar beet seed.

Burtch, L. M., and Carlson, C. C. Yield comparisons from chemically, mechanically, and hand-weeded sugar beets under watergrass conditions in California.

Hall, J. W. Grass control in sugar beets in Manitoba.

Anderson, D. T., Dubetz, S., and Russell, G. C. Studies on transplanting sugar beets in Southern Alberta.

Genetics and Variety Improvement

Coe, Gerald E. Meiosis in *Beta "trigyna"* $2n = 45$.

Johnson, R. T. Generation studies of interspecific crosses within the genus, *Beta*, backcrossed to *Beta vulgaris*.

Savitsky, Helen. Meiosis in an F_1 hybrid between a Turkish leaf beet (*B. vulgaris* L.) and *B. procumbens* Chr. Sm.

Oldemeyer, R. K. Further developments with patellares × vulgares hybrids.

Finkner, R. E., and Swink, J. F. Reactions of galactinol selected beet varieties. I. In breeding for nematode resistance.

Finkner, R. E., and Swink, J. F. Reactions of galactinol selected beet varieties. II. In soil relatively free of the sugar beet nematode.

Price, Charles. Selections of sugar beets for resistance to sugar beet nematode.

Smith, Clifton H., Price, Charles, and Jorgensen, Edsel C. Evaluation for nematode resistance in sugar beets at Salt Lake City in 1957.

Murphy, Albert M., Smith, Clifton H., Ryser, G. K., and Owen, F. V. Evaluation of curly-top-resistant monogerm hybrid sugar beets.

Brewbaker, H. E., and Oldemeyer, R. K. The development of monogerm varieties by the backcross method.

McFarlane, J. S., and Bennett, C. W. Variability in sugar beet strains to damage from virus yellows.

Kohls, H. L. A study of some correlations in sugar beets.

Wood, R. R., Bush, H. L., and Oldemeyer, R. K. Use of the sucrose-sodium relationship in selection of sugar beets.

Oldemeyer, R. K., and Bush, H. L. General combining ability studies.

Peterson, D. F., and Dickenson, D. D. Results of divergent selection for general combining ability.

Rush, George E., and Oldemeyer, Donald D. Evaluation of combining ability in self-fertile lines of sugar beets using male-sterile testers.

Dudley, John W. Number of chloroplasts in the guard cells of sugar beet leaves as an indicator of ploidy level.

Savitsky, Helen, and Savitsky, V. F. Research and breeding with polyploid beets in Western Europe.

Savitsky, V. F., and Savitsky, Helen. Genetic research and the principal methods of beet breeding in Western Europe.

Doxtator, C. W., and Finker, R. E. Sugar beet germination selection results in osmotic pressure solutions. I. Germination methodology and selection effect on germination of four varieties.

Doxtator, C. W., Hanzas, P. C., and Olson, R. F. Sugar beet germination selection results in osmotic pressure solutions. II. Yield and chemical constituents of progenies of four varieties from osmotic selection.

Hogaboam, G. J. Type "O" indexing with the *Sh* gene.

Stein, Hava, and Gableman, W. H. Red anthers associated with pollen sterlity in table beets.

Stein, Hava, and Gableman, W. H. Reversion of cytosterile sugar beet-table beet crosses to partial fertility.

Savitsky, V. F. The grade of manifestation of male-sterlity in different cytoplasmic monogerm male-sterile races.

Entomology and Plant Pathology

Duffus, James E., and Costa, A. S. Beet ring mottle disease.

Costa, A. S., Duffas, James E., and Bardin, Roy. Malva yellows, an aphid-transmitted virus disease.

Bennett, C. W., Jewell, H. K., and Hills, Orin A. Cucumber mosaic in seed fields of sugar beets in the Salt River Valley of Arizona in 1956-57.

Bennett, C. W., and Tanrisever, Aziz. Curly top in Turkey.

Murphy, Albert M., Bennett, C. W., and Owen, F. V. Further studies concerning varietal reaction of sugar beets to virus strain No. 11 under field conditions.

Hills, Orin A., Bennett, C. W., and Jewell, H. K. Progress report on studies to determine the effect of virus yellows on the sugar beet seed crop.

Jewell, H. K., Mast, A. A., and Hills, Orin A. Occurrence of the yellows virus in beets grown for seed in the Salt River Valley of Arizona and a survey of its reservoirs and vectors.

Fife, J. M. Changes in the concentration of certain amino acids in the leaves of sugar beet plants affected with virus yellows.

Lackey, Charles F. Effect of virus yellows and beet mosaic singly and in combination on sugar beets.

Caveness, Fields E. The incidence of *Heterodera schachtii* soil populations in various soil types.

Caveness, Fields E. Population density gradients of the sugar beet nematode, *Heterodera schachtii*.

Caveness, Fields E. Status of crop sequences related to *Heterodera schachtii* on sugar beets.

Golden, A. Morgan. Interrelationships of certain *Beta* species and *Heterodera schachtii*, the sugar beet nematode.

Viglierchio, David R. Collection and selection of cysts of the sugar beet nematode, *Heterodera schachtii*.

Holst, E. M., and Cormany, C. E. Results of some commercial fumigants on sugar beets.

Turner, G. O. Techniques for increasing the efficiency of 1,3-Dichloropropenes soil fumigants in the control of the sugar beet and root-knot nematodes in sugar beets.

Johnson, R. T., and Wheatley, G. W. The effects of different rotations on sugar beet production in land infested with sugar beet nematode.

Hills, Orin A., Valcarce, A. C., Jewell, H. K., and Condriet, Don. Beet leafhopper control in sugar beets by seed or soil treatment.

Heath, R. H., and Dickenson, D. D. The use of systemics, Disyston and Thimet, to control virus yellows in California.

Hills, F. J., and Leach, L. D. Specific fungicides used alone or in combination as sugar beet seed treatments.

Schneider, Charles L. Testing sugar beet strains in the greenhouse for resistance to *Aphanomyces cochlioides*.

Schuster, M. L., Jensen, Stanley G., and Sayre, Richard M. Toothpick inoculation method for testing reaction of sugar beets to *Rhizoctonia solani* crown and root-rot isolates.

Gaskill, John O., Pierson, Victor G., Mueller, Kenneth E., and Gerhold, Norman R. Preliminary studies on *Rhizoctonia* inoculation methods with sugar beets.

Agricultural Engineering

Buchele, W. F., Stout, B. A., and Morton, Carl T. Mechanical operations and emergence.

Tolman, Bion and Johnson, Ronald C. Comparison of the labor requirements of monogerm and multigerm seed plantings.

Broadwell, Charles E. Progress report on spring labor reduction in Ontario, Canada, in 1957.

Holmes, Lester J., and Kay, Curzon. Overcoming growers resistance to mechanical thinning.

Loomis, R. S., Hills, F. J., and Morse, M. D. Thinning studies on hill-planted sugar beets.

Tanner, J. C. Combined use of mechanical thinner, finger weeder, and rotary hoe.

Murphy, Albert M., and Owen, F. V. Results obtained by the mechanical thinning of monogerm sugar beets.

Borden, J. W. A manufacturer's observations of mechanical thinning.

Melroe, Roger T., and Kelley, Robert. The Melroe Coil Spring Harrow saves manhours in your beet field.

Stout, B. A., Snyder, F. W., and Buchele, W. F. Further studies on the effect of soil compaction on sugar beet seedling emergence.

Barmington, R. D. Planting equipment for monogerm seed.

Cannon, Rowland M., Bigler, A. J., and Tolman, Bion. Factors affecting seeding rate and seed distribution of monogerm seed.

Wheatley, G. W. The effects of seed size, cell size, and plate speeds on the planting rates of sugar beet seed.

Nixon, G. W. Bed planting in American Crystal Sugar Company territory.

Sorenson, Knud B. John Deere No. 74-76 Fertilizer Flexi-Planter.

Steele, Clarence R. The Silver piler with drive-over end-dumper.

Silver, Joseph M., and Stone, Jay G. Receiving, unloading, conveying, screening, and piling sugar beets with Silver pilers manufactured by Ogden Iron Works Company, Ogden, Utah.

Armer, Austin. Improvements in cultural operations through mechanization.

Ldmiston, J. D. A description of the ideal beet planter.

Ripper, W. E. A selective control of broad-leaved weeds in sugar beet.

Chemistry and Factory Operation

Wright, James C. The DdS Silver slope difuser.

McCready, R. M., Teranishi, Roy, Goodban, A. E., Walker, H. G., Jr., Morgan, A. I., and Knowles, R. E. Effects of sugar beet nitrogen on diffusion and carbonation.

Morgan, A. I., Goodban, A. E., Teranishi, Roy, Knowles, R. E., and McCready, R. M. Effect of some variables on first carbonation.

Woods, Allan. Semiautomatic filtration of standard liquor with Sparkler type RSC filters.

Morin, Robert G. Polymeric flocculents for the clarification of beet sugar juice.

Springer, Neil. Conditioning of sugar for bulk shipment.

Zievers, James F., and Riley, Clay R. Extraction of sucrose from filter cakes.

Goodban, A. E., Jaouni, T., and McCready, R. M. Determination of pulp moisture.

Halden, H. E. An accelerated sieve test for powdered sugar.

Halden, H. E., Leethem, D., and Eis, F. G. Developments in the microbiology of liquid sugar.

Olson, R. F. Odor in granulated sugar.

Koenig, W. P., and Lancaster, G. D. Role of reodorants in odor abatement problems.

Gaddie, Robert S., and West, Robert R. Relationship between white pan pH and saponin content of the sugar.

Rush, George E., Oldemeyer, Donald L., and Parrish, Coulson P. Effects of varieties and nitrogen fertilization on the production and processing of sugar beets. Agricultural phase.

Rawlings, Frank N., and Rounds, Hugh G. Effects of varieties and nitrogen fertilization on the production and processing of sugar beets. Economic evaluation.

Morgan, A. I., Barta, E. J., and Kohler, G. O. Development of a sugar beet processing laboratory.

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Rounds, Hugh G. and Kunkel, Paul C. Studies in the measurement and evaluation of crystallization velocity.

Kent, Sheldon E., and Davey, John W. Improved crystallization of sugar end syrups with Hodag CB-6 additive.

Hanzas, Peter C. A paper chromatographic method for the semiquantitative analysis of amino acids found in sugar beet juice.

Price, Charles and Fife, J. M. Comparisons in purity of six varieties of sugar beets by means of two methods of determinations.

Eis, F. G. New method of estimating sugar losses in stored beets.

Hungerford, E. H., and Muller, Dan. Reuse of cold waste in Steffen cooler operation.

Johnson, Julian R., and Church, Tom C. A study of some components effecting Steffen losses.

Olson, R. F. A comparison of the viscosity values of various molasses samples from ten factories, 1956 campaign.

Hallbeck, R. E. Determination of true purity of California beet molasses.

Stark, J. B., Goodban, A. E., Jaouni, T., and McCready, R. M. The composition of sugar beet molasses.

Stark, J. B., and Goodban, A. E. Unidentified nitrogen compounds in beet molasses.

Schwieter, Arthur. The drying of lime cake.

Fee, Robert G. Recent developments in filtration of beet sugar liquors.

Physiology

Hogaboam, G. J. An air-conditioned chamber for post-induction handling of sugar beets.

Hogaboam, G. J. An humidity chamber for summer rooting of sugar beet cuttings.

Wittwer, S. H. Some effects of gibberellin in growth and plant development.

Lawson, W. A. The effect of gibberellic acid as a growth accelerator on sugar beets.

Stout, Myron. Some effects of gibberellic acid on the physiology of sugar beets.

Doxtator, C. W. Gibberellic acid stimulation effects on seed and seedlings in sugar beets.

Snyder, F. W., and Wittwer, S. H. Some effects of gibberellin on stem elongation and flowering in sugar beets.

Gaskill, John O. Studies on the use of gibberellic acid as a reproductive stimulant in sugar beet seedlings.

Wheatley, G. W., and Johnson, R. T. Studies on the use of gibberellic acid to induce flowering in sugar beets.

McFarlane, John S. Informal discussion of experiences at Salinas with gibberellic acid.

Snyder, F. W. Effect of nitrogen on yield and subsequent germinability of sugar beet seed.

Loomis, R. S., and Ulrich, Albert. Responses of sugar beets to nitrogen depletion in relation to root size.

Ulrich, Albert. Effects of climate on sugar beets grown under standardized conditions.

Ulrich, Albert. Effects of number of plants per pot on growth and chemical composition of sugar beets.

Nelson, R. T., and Wood, R. R. Studies of chemical treatments on sugar beets including gibberellic acid, 2,4-D and maleic hydrazide.

Snyder, F. W. Effect of gibberellin on germination and early growth of the sugar beet.

Peterson, Donald F. Effect of gibberellic acid on germination, sucrose, and yield of sugar beets.

Schreiber, K. An unusual tropism of feeder roots in sugar beets and a possible new approach in planting direction and fertilizer placement.

Zukel, John W. Effect of some environmental factors on rate of absorption of maleic hydrazide by several plants.

Wort, D. J., and Shrimpton, M. Effect of frost defoliation on chemical composition, enzyme activity, and respiration of the mature sugar beet root.

Wort, D. J., and Shrimpton, M. Terminal oxidase enzymes of the mature sugar beet root.

Ulrich, Albert, and Ohki, Kenneth. Preparation and storage of beet pulp samples for sucrose analysis.

Finkner, R. E., Finkner, M. D., and Olson, R. F. Effects of storage on raffinose content of sugar beets. I. Varietal changes occurring during storage.

Finkner, R. E., Finkner, M. D., and Olson, R. F. Effects of storage on raffinose content of sugar beets. II. Estimates of components of variances with major and minor classifications of sub-sample means.

Finkner, R. E., Swink, J. F., Doxtator, C. W., Olson, R. F., and Hanzas, P. C. Changes in raffinose content and other characteristics of sugar beet varieties during six different harvest dates.

Spikes, John D., Stout, Myron, and Savitsky, V. F. Photosynthesis, growth, and metabolism of a pale green (Chlorina) sugar beet mutant.

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Marketing Ability

(Continued from page 31)

load industrial users in Chicago, probably in all the known and proven forms of bulk sugar including liquid. If we don't find that way we may stand by and watch our greatest market be engulfed by the flood of sugar that will come down the St. Lawrence Seaway."

Mr. Love concluded with the statement that full development of marketing potential would be of inestimable value in assuring at least the same share as they now have of the increasing American market for the western beet sugar industry.

■

Calculator For Filter Area Available

A pocket size calculator to facilitate rapid determination of filter area required for efficient filtration is being offered without charge by the Niagara Filter Division of American Machine & Metals, Inc. Constructed on the slide rule principle, the filter area may be determined in terms of filtration rate on one side and in terms of cake capacity on the other. The greater of the two area requirements obtained represents the square feet of filter area to be used.

Sugar Industry Technicians 17th Meeting

Tentative plans for the meeting of the Board of Directors of Sugar Industry Technicians, Inc., just prior to the first technical session have been announced by Frank A. Monroe, president. The Board will meet on May 11th. First business meeting of the Society will be held at 4:30 p.m. on May 12th and the Banquet will be held that evening. The program for the two-day technical session will be announced in February and advance abstracts of all papers will be distributed to the members.

■

Firm to Expedite Sugar Equipment Orders

A new service available to foreign industry and importers of American equipment has been started recently under the name RG Expediters Service with headquarters at 220 Fifth Avenue, New York 1, N. Y. The objectives of the firm are to assist firms and individuals located abroad in the procurement of materials or services in the United States. The company will assist in locating sources of supply for equipment, obtain quotations, samples, and catalogs. It will also follow up orders already placed to expedite delivery or to obtain interim reports on the exact status of equipment that has already been ordered. Manager is Robert F. Gueydan who has had extensive experience in exports as vice president and manager of Alberto Ubbelohde Inc. He also acted as Assistant Director of Purchases, Remington Rand Division, Sperry Rand Corporation, and Procurement Representative in the Eastern United States for Convair, manufacturer of aircraft and guided missiles.

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Correction: "Puerto Rico Increases Fertilizer Use 1000%"

On page 33 of the January, 1958 issue of SUGAR Y AZÚCAR, there appeared an article entitled, "Puerto Rico Increases Fertilizer Use 1000%," credited to our correspondent, Arturo Riollano. Owing to an unfortunate oversight, Mr. Riollano's request that we list Dr. George Samuels, Agronomist, and Dr. B. G. Capó, Associate Director for Research of the University of Puerto Rico, as authors, was not attended to. The material for the article was taken from Technical Paper 16 (Research with Sugarcane Fertilizers in Puerto Rico, 1910-54) published in March 1956.

Forecast & Review

1958 Sugar Outlook Plagued with Uncertainties

By Alexander C. Muir, Manager
Research & Statistics Dept.
B. W. Dyer & Company

THE outlook for 1958 world sugar prices is plagued with uncertainties, which include the explosive international situation, civil disturbances in Cuba, and conflicting reports of Soviet production. Thus, volatile prices seem likely, although the range may be smaller than in 1957.

Early in 1957 world sugar prices advanced to levels which exceeded the U.S. spot raw sugar price for the first time since the Korean war. The relatively tight world statistical position was intensified by Russian purchases, and the spot price reached 6.85¢ per pound on April 22nd. A much larger Cuban crop than originally anticipated, and Brazilian offerings caused world prices to decline thereafter, and on November 5th the year's low of 3.50¢ was reached. Subsequent reports of cane destruction in Cuba, resulting from poltical strife, caused a moderate rise in prices.

International Sugar Agreement quotas have been declared in effect this year. However, if the world price rises above the 4¢ level, quotas would become inoperative, as they were during the January 25-November 19th, 1957 period. While there apparently will not be too much over-quota sugar available in most countries in the early part of 1958, any significant price rise probably would encourage offerings. On the other hand, the Agreement also contains a provision whereby quotas would be tightened if the price falls below 3.25¢ for the specified period.

World sugar production during the 1957/58 crop year probably will be about 47,700,000 short tons, raw value, according to the U. S. Department of Agriculture, compared with about 45,500,000 tons in the previous period, or a gain of about 5%.

Western European production is expected to be 400,000 to 500,000 tons higher than last season, but smaller beet crops are predicted in Italy, Spain and the United Kingdom. Eastern Europe is also expected to be somewhat higher, but the U. S. Department of Agriculture places Russian production at only 4,800,000 short tons contrasted with F. O. Licht's estimate of about 5,600,000 short tons. If the former figure is right, the Soviet sphere may again be a net importer, while if Licht's estimate is correct, it would be a net exporter.

The Sugar Institute has recommended that Cuba restrict its 1958 outturn to approximately the amount produced in 1957, or about 6.25 million short tons, although Cuba might produce over seven million short tons if there were no government restrictions. In any event, there apparently is substantial additional cane which could be destroyed in the political struggle before it would have a serious influence on the world market position.

Brazil, Peru, the Dominican Republic, South Africa and India are among those that expect significant increases in production. The U. S. Beet and Cane crops, which are now being processed, are at record levels. On the other hand, a smaller crop is forecast for Argentina, and political trouble may affect 1958 Indonesian output.

World sugar consumption in recent years has increased at an annual average rate of about 5%. While foreign-exchange difficulties in some countries may slightly reduce the 1958 rate of increase in demand, anticipated normal consumption should approach the U. S. Department of Agriculture's production estimate.

The International Sugar Council estimates 1958 free-market sugar requirements (which are only a small part of total world consumption) at about 6,080,000 short tons, raw value, compared with a 1957 estimate of about 6,880,000 short tons. The decrease in estimated requirements for 1958 is undoubtedly largely attributed to the anticipated increase in European production.

Initial world export quotas for 1958 were set at about 5,360,000 short tons, raw value, for participants in the International Sugar Agreement. Moreover, at least one million tons also will probably be available for export from countries that are not members of the Agreement.

At first glance, it appears that available free market supplies will be in excess of estimated demand. However, it is questionable whether the export quotas of Soviet countries, amounting to about 810,000 short tons, will be filled.

Although most of the major supplying areas located offshore had little carryover available for the U. S. market at the end of 1957, Cuba had at least 600,000 short tons. Thus, unless the destruction of Cuban cane is intensified, or war-scare buying develops, this should be adequate to take care of U. S. needs until new-crop production is available.

Unfavorable weather in 1957 helped to create quota deficits in Puerto Rico, the Philippines and Hawaii. Current production estimates indicate there will be little or no 1958 quota deficits in the Philippines and Hawaii, while any Puerto Rican deficit apparently will be substantially less than in 1957.

The initial 1958 U. S. quota was set at 8,800,000 short tons, which is slightly less than anticipated consumption of around 8,900,000.

For 1957, the initial quota also was set at 8,800,000 tons, but advancing world and U. S. sugar prices resulted in three quota increases, reaching 9,300,000 tons on July 3rd. Subsequently, as prices declined and U. S. deliveries fell behind those of the previous year, three quota reductions took place, and the final 1957 quota was placed at 8,975,000 tons.

U. S. refined sugar distribution for 1957 apparently totalled less than 8,700,000 short tons, while consumption was estimated at about 8,800,000 tons. Thus, "invisible" inventories (those held by industrial and institutional sugar users, chains, wholesalers and household consumers), which at the beginning of 1957 were estimated to be well above normal, were substantially reduced, although "constructive" and "in transit" deliveries of beet sugar at the end of 1957 offset some of this reduction.

Visible inventories in the U. S. (those held by primary distributors), at the end of 1957, on the other hand, were probably about 100,000 tons higher than at the beginning of the year. Beet processors' inventories were up 50-100,000 tons, while cane refiners showed an increase of about 50,000 tons. However, only about 50% of the cane refiners' inventories normally are found in the Northeastern area.

U. S. consumption in 1958 is estimated at about 8,900,000 short tons, raw value, by the Department of Agriculture. However, refined sugar distribution might deviate slightly from that figure, depending on how much "invisibles" are absorbed and the extent of the expected recession in general business activity. Because of the ramifications of the Sugar Act, demand in the Northeast again is likely to create a greater impact on quota supplies than in other areas of the country. Of course, scare buying, caused by an increase in Cuban crop destruction or foreboding international developments, could easily boost demand above normal levels.

The world raw sugar price during the first half of 1957 was above the comparable

(Continued on page 46)

A New Disease of Sugar Cane

Bacterial Mottle in Queensland

By D. R. L. Steindl
Senior Pathologist, Bureau of Sugar Experiment Stations, Queensland

During the past decade officers of the Colonial Sugar Refining Company have reported the sporadic occurrence of an apparently new disease of sugar cane in badly drained fields in areas of North Queensland. The name "root disease" had been given to the disease by the Company pathologists owing to the very poor development of the rooting system in diseased plants. Within the past two years Bureau officers have found the disease in a number of other locations. The occurrence of the disease in these areas suggests that it could become of economic importance and was the reason for the initiation of this investigation into its cause and method of transmission.

Early symptoms of the disease consist of creamy white, regular stripes one to two millimeters wide, extending from the base, or near the base of the leaf blade upwards parallel with the vascular bundles. One to many stripes may occur on each leaf; sometimes they extend the full length of the leaf, but more often cease at irregular intervals along it. Orange to rusty-red areas later develop, and eventually the greater portion of the stripes becomes involved. At this stage the disease has a marked resemblance to the advanced stages of downy mildew. As the disease progresses the infection becomes systemic, growth of the infected shoots slows down, and the young leaves develop a chlorotic mottling, frequently without the distinct stripes. As these leaves age numerous small rusty-red flecks and short narrow stripes appear; later the tips and edges wither, the leaves curl inwards and the whole shoot eventually dies. Diseased stalks frequently produce numerous side shoots at the base, which also show the characteristic mottling and rusty appearance on the leaves. Small, brown necrotic areas occur within severely diseased stems, particularly in the vicinity of the nodes and the growing point. On occasions they may break down to form small cavities which frequently contain droplets of a gummy substance.

Whole stools may become diseased, but sometimes only a portion of a stool is affected, and this part will eventually die out leaving the remainder of the stool apparently healthy. If a diseased stool is transplanted, or if diseased setts are planted, they will produce only small sickly shoots which die out after a few weeks growth.

Microscopic examinations of diseased leaves and stems revealed immense numbers of bacteria within the tissues, and a bacterium has been readily isolated in pure culture from a large number of diseased specimens. The identity of this bacterium has not yet been established, however, it is a multi-flagellate, rod-shaped organism possessing a number of characteristics of the *Erwinia*. Cultures have been forwarded to the Commonwealth Mycological Institute for identification.

The pathogenicity of this bacterium has been shown by a number of inoculations into setts and young shoots of the varieties Q.57 and Trojan. With Q.57, 46 plants germinated, but after reaching a height of three or four inches 17 of these plants turned yellow, wilted and died. Of the remainder five plants later developed the typical leaf streaks and mottling characteristic of the disease. In the case of Trojan all plants germinated, two died at an early stage as with Q.57 and three later developed characteristic symptoms. In both varieties the bacterium was readily re-isolated from the infected plants. Uninoculated setts planted at the same time all grew normally.

In a second experiment 24 young shoots were inoculated with a suspension of the bacterium. After about ten days all plants were showing a reddened necrotic area around the points of inoculation on the young unfolding leaves, with a chlorotic mottling extending from this area. The Q.57 plants were more severely affected than the Trojan plants. About three weeks after inoculation, streaks typical of the disease began to develop on all the plants, and again the bacterium was readily isolated. Later many of the plants began to produce healthy leaves, and appeared to be recovering from the disease. However, prolific side shooting then commenced at the base and the side shoots bore characteristic symptoms of the disease. It appears that the bacteria are carried down the leaf sheaths to the buds, which in turn become infected, producing systemically diseased side shoots. Three months after inoculation the Q.57 plants had only four diseased primary shoots, yet 22 out of 24 plants showed diseased side shoots. Trojan did not show any disease in the primary shoots, but ten out of 20 plants inoculated were side shooting. Again, uninoculated plants of both varieties were normal.

Transmission of the disease in the field is usually not rapid, but it is very destructive when plants do become infected. The disease usually occurs in low lying areas, and its spread appears to be associated with flooding; it usually appears in ratoon crops which have been flooded as plant cane. It is quite

Figure 1. Leaves of Trojan affected with "bacterial mottle," a new disease of sugar cane. The blade on the far left is only partly affected.

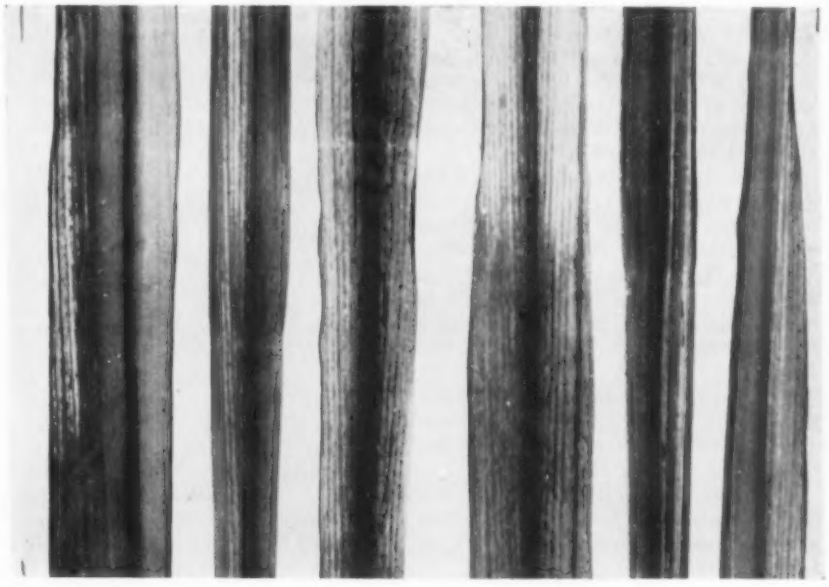

Figure 2. Stool of Trojan affected with bacterial mottle, Herbert River, North Queensland.

probable that the bacterium is carried by flood waters and if it happens to lodge in the spindle of a young shoot, in buds at the base of a stool, or in a wound, may be able to set up an infection.

The varieties Q.57 and Trojan seem to be the most susceptible of those varieties grown where the disease occurs, however, it has also been found in Badila, Comus, Eros, and Q.45.

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International Cane Technologists Committee Appointments

Appointments have been announced for the Program and Publications Committee of the 10th Congress of the International Society of Sugar Cane Technologists, which will meet in Honolulu, Hawaii, May 3-23, 1959.

Dr. L. D. Baver, Director of the Experiment Station, Hawaiian Sugar Planters' Association, General Chairman of the Congress, has named the following:

Dr. Roger P. Humbert, Principal Agronomist, Experiment Station, HSPA, will be chairman of the Program and Publications Committee (Address: Experiment Station, HSPA, Honolulu, Hawaii).

Dr. John H. Payne, Principal Sugar Technologist, Experiment Station, HSPA, Factory Section Chairman (Address: Experiment Station, HSPA, Honolulu, Hawaii).

J. P. N. Bentley, Factory Manager, Tongaat Sugar Co., South Africa, Milling Subsection Chairman (Address: Tongatt Sugar Co., Maidstone, Natal, P.O. Box 5, So. Africa).

C. N. Davis, Chief Chemist, Colonial Sugar Refining Co., Australia, Processing Sub-section Chairman (Address: 1 O'Connell St., Sydney, N.S.W., Australia).

R. J. Innes, Director of Research, Jamaica Sugar Manufacturers Assn., Agriculture Section Chairman (Address: Mandeville P.O., Jamaica, B.W.I.).

Dr. H. M. Tysdal, United States Department of Agriculture, Cane Breeding Section Chairman (Address: Tobacco & Sugar Crops Section, USDA, Beltsville, Maryland).

C. G. Hughes, Pathologist, Queensland (Australia), Pathology Section Chairman (Address: Bureau of Sugar Experiment Stations, William Street, Brisbane, Queensland, Australia).

Ralph Mathes, Entomologist, USDA Experiment Station, Houma, Louisiana, Entomology Section Chairman.

Papers in these sections will be presented during the week of May 18-22, 1959.

Dr. Baver requests two copies of all non-invitational papers be submitted. Abstracts must be received by July 1, 1958, and manuscripts by November 1, 1958.

In addition to Dr. Baver, officers for the 10th Congress include:

Dr. S. J. P. Chilton, Head, Department of Plant Pathology, Louisiana State University, Baton Rouge, La., who is General Vice Chairman.

W. W. G. Moir, American Factors, Ltd., Honolulu, Hawaii, is Secretary-Treasurer.

General Committee Chairmen include:

Dr. John N. Warner, Senior Geneticist, Experiment Station, HSPA, who heads the General Organizing Committee.

Dr. Humbert of the Experiment Station, HSPA, is Program Chairman.

The American Express Company has been designated as official Transportation Agents for the Congress. They will handle transportation to Hawaii, hotels and local travel in the Islands. All travel and accommodation arrangements should be made through the nearest American Express Company office, or through their Honolulu office, 2388 Kalakaua Ave., Honolulu, Hawaii.

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Rain Gauge Records Inches and Millimeters

The accompanying illustration shows the components of a new rain gauge capable of measuring precipitation in inches or millimeters. The parts illustrated comprise an aluminum ground stake 18 inches long, a support post 24 inches long, a collector can with an evaporation baffle and aluminum ground-radiation shield disc. A second collector can with cap, and a graduated measuring vessel are provided. Collector cans are changed at the weather station, the filled container being brought to the laboratory for measurement. Since two units of measurement are used in sugar production areas where the rain gauge is of increasing importance, it is of interest to note that the design of the Universal Rain Gauge is based on the volume of a true metric liter of water. Water in the collector can at a depth of exactly one inch will measure by volume 100 milliliters. Hence the quantity, in milliliters, of water collected by the can equals the depth, in hundredths of an inch, of the precipitation. To obtain depth expressed in millimeters the volume, milliliters, is divided by four or a conversion table is used. Equipment is manufactured by M. C. Stewart under the name of Universal Rain Gauge.

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Cuban-American Earnings Up

The Cuban-American Sugar Company shows in its annual report for the year ended September 30, 1957 a net income of $3,013,-912 compared with net income of $2,719,401 for the preceding year. Dividends increased 50 cents per share and amounted to $1.75 per share of common stock; dividends on preferred were $7.00 per share. Various improvements are reported for Colonial Sugars Company at the Gramercy refinery including a new turbine generator and boiler. In Cuba the replacement of steam locomotives with Diesels continued; new vacuum pans and evaporators have been installed at Chaparra and Delicias. Of major significance is the formation of a sucro-chemical division of Colonial to produce chemicals using cane sugar as the major raw material. Cuban-American has long been active in the Sugar Association, Inc., participates in The Sugar Cane Wax Enterprise, owned jointly with S. C. Johnson & Son, Inc., and is a member of the Cane Improvement Committee.

Personal press station

California and Hawaiian Sugar Refining Corporation has elected **James H. Marshall** Executive Vice President and **Paul A. Cooper** Vice President and Assistant to the President. Prior to joining C & H, Mr. Marshall was affiliated with the U. S. Department of Agriculture in Washington, D. C. He was Director of the Sugar Branch when he went to C & H as Assistant to the President in 1948. Paul A. Cooper, formerly General Manager of the Nestle Company's chocolate manufacturing operations in Fulton, New York, joined C & H in 1956, also as Assistant to the President.

Harry A. Elcock, district manager of The Amalgamated Sugar Company at Twin Falls, Idaho since 1937, has been promoted to general agriculturist of the concern with headquarters in Ogden. Mr. Elcock was graduated from Washington State College in 1926 and obtained an M.S. degree from Michigan State in 1928. He was assistant plant pathologist for the U. S. Department of Agriculture at Las Cruces, New Mexico and later was manager of the Western Seed Production Corporation at Phoenix, Arizona, which was the first successful sugar beet seed producing company in this country.

Harry A. Elcock

William H. Schaum has been named President of Punta Alegre Sugar Corporation to succeed the late Vivian J. Gianelloni. Mr. Schaum was born in Wooster, Ohio. Upon graduation from Ohio Northern University in 1923, he started to work for Punta Alegre as Civil Engineer and then as Assistant Manager of Central Florida. In 1948, Mr. Schaum became Manager of Florida Industrial Corporation of New York, one of the Punta Alegre associated companies. Then in 1952, he was appointed Vice President and General Manager of Punta Alegre Sugar Corporation.

William A. Schaum

Thomas H. Allen has been named executive Vice President of Sterling Sugars, Inc. effective January 1, 1958. Mr. Allen was formerly deputy director of the Sugar Division of the Commodity Stabilization Service of the U. S. Department of Agriculture. J. Adalberto Roig is president and Earl B. Wilson is chairman of the Board of Sterling.

E. J. (Ted) Faust has been appointed General Sales Manager of Canada and Dominion Sugar Company Ltd. it has been announced by President W. J. McGregor. Mr. Faust has had over 27 years experience in the sales department of the company.

Robert I. Herndon, General Sales Manager of California and Hawaiian Sugar Company since 1948, has resigned his position to devote full time to his personal business interests. Mr. Herndon first joined C and H in 1935 and in 1940 rejoined the company as Assistant Sales Manager of the Western Division.

Mrs. Rose Marie Pangborn and David Quinlan, advertising coordinator for Sugar Information, Inc., discuss the findings of a four-year research program conducted to determine the relationship of sugar and flavor in prepared foods. Mrs. Pangborn, a food technologist at the University of California, where the sweetness studies were conducted, pointed out that laboratory tests, and consumer surveys of individuals and households all point to one finding: people like canned fruit with more sugar in the pack than is currently offered in stores today.

facts about sugar

JANUARY 6, 1958:—The Sugar Stabilization Institute has recommended that 1958 Cuban production be restricted to 5,500,000 Spanish long tons, raw value (about 6¼ million short tons), according to reports received by B. W. Dyer & Company, Sugar Economists & Brokers.

Political strife has caused some destruction of the Cuban crop. As a result, Cuban mills were authorized to start grinding between December 5th and January 10th, or about one month earlier than usual. However, there was no great rush to start grinding early, and, of January 3rd, only 10 mills were officially reported operating, although several others were unofficially reported to have started grinding.

Cuban sales to the world market (outside the U. S.) during 1957 were 2,960,113 short tons, according to a survey compiled by Willett & Gray Inc., compared with 2,985,656 short tons in 1956.

World sugar spot prices declined from 4.03¢ per pound on December 6th to 3.75¢ in the middle of the month. Later, they advanced, but then declined to 3.75¢ on January 3rd.

Domestic spot raw sugar prices at New York declined from $5.75 per 100 pounds on December 9th, and were $5.62 on January 6th. Refined sugar prices were generally unchanged during that period.

U. S. refined sugar deliveries through December 28th were 8,501,000 short tons, raw value, compared with 8,811,000 tons during the corresponding period last year. Consequently, it appears that total deliveries for 1957 may be slightly below 8,700,000 short tons.

The Department of Agriculture on December 20th set the initial 1958 U. S. quota at 8,800,000 short tons, raw value. In making the announcement, it was pointed out that "invisible" inventories probably were reduced during the 12 months period ended October 31, 1957 and that actual consumption exceeded distribution by at least 100,000 tons. Consumption in 1958 is estimated at 8,900,000 tons, although actual distribution might be reduced by year-end 1957 "constructive," and "in transit" deliveries of possibly 150,000 tons, which will not be received until 1958. Refiners' inventories are expected to be larger at the beginning of 1958 than a year earlier. It was also pointed out that the average refined sugar price at New York for the first 10 months of 1957 was 9.15¢ per pound, or 4% above those of 1956, but about ½¢ per pound below the "yardstick" price in the Sugar Act. Area quotas are as follows (in short tons, raw value):—Domestic beet 1,909,188; Mainland cane 587,476; Hawaii 1,065,513; Puerto Rico 1,114,130; Virgin Islands 15,193; Philippines 980,000; Cuba 2,942,115; Peru 55,588; Dominican Republic 51,757; Mexico 34,209; Nicaragua 10,584; Haiti 5,761; Netherlands 3,313; China 3,267; Panama 3,257; Costa Rica 1,123; Canada 631; United Kingdom 516; Belgium 182; British Guiana 84; Hong Kong 3; All other countries 0.

The U. S. Department of Agriculture on December 20th announced its determination of "fair and reasonable price" for the 1957-58 crop of Puerto Rican sugar cane. It differs from the 1956-57 crop determination in: (1) the pricing period for raw sugar extends from Jan. 1 through Dec. 31, 1958; (2) the definition of the sugar yield period has been changed to permit a processor to use any period not to exceed one calendar month; and (3) a processor operating more than one mill will compute the gross proceeds from molasses on the basis of the molasses sales at all mills operated by the processor and will compute the net proceeds separately for each mill.

The 1957/58 Philippine crop is expected to produce about 1,250,000 short tons of sugar, compared with a previous estimate of about 1,206,000 tons and 1,142,960 tons last season. Despite the increased estimate, it apparently will not meet 1958 quota requirements of 952,000 tons for the U. S.; 310,000 tons domestic; and 27,500 tons for the world free market. However, some of the 1958/59 crop probably will be used to meet quotas when it is available, B. W. Dyer & Company concludes.

Sugar Prices January 6, 1958

Ex Duty Raw Sugar New York	**5.62**
Average No. 6 Raw Sugar January 2-January 6	**5.62**
Refined Sugar Gross, New York	**9.15**
No. 4 Raw Sugar (f.o.b.) Cuba	**3.75**
Average No. 4 Sugar January 2-January 6	**3.81**

Futures Prices	***Contract #6***	***Contract #4***
March, 1958	**5.62**	**3.75**
May, 1958	**5.67**	**3.75**
July, 1958	**5.73**	**3.75**
September, 1958	**5.79**	**3.75**
October, 1958	—	**3.72**
November, 1958	**5.82**	—

Meeting of Puerto Rico Technologists

Papers of major interest read before the Puerto Rico sugar technologists at their annual conference December 7 and 8 included the following: "Use of Steam Flowmeters at the Vacuum Pans" by Alfred L. Webre; "Possibility of Extending the Length of the Sugar Harvest in Puerto Rico" by B. G. Capó; "Typical Operation of the Boiler House and Its Effect on Steam Consumption in the Sugar Factory" by Emilio J. Morales; "Some Experiments with Ion Exchange Resins" by Gonzalo R. Serbia; "Chemical Control of the Sugar Factory" by Francisco J. Remirez Silva; "Some Observations on Sugar and Its Future in the Development of Agriculture in Puerto Rico" by Scott Keyes.

There was also a round-table discussion on the economic problems of the industry in which Rafael Carrion, Jr., president of Banco Popular of Puerto Rico; Candido Oliveras, president of the Puerto Rico Planning Board; and Antonio Roig, Jr., president of the Puerto Rico Sugar Technologists' Association participated.

The Federal Department of Agriculture has assigned to Puerto Rico a quota of 1,114,130 short tons as part of the total of 8,800,000 tons that may be sold on the U. S. market during 1958. A quantity of 130,016 tons has been allotted for local consumption in the island, so that the total permitted production will amount to 1,220,000 short tons. Although it is yet too early to estimate the actual production, the opinion among local sugar men is that the 1958 production will not exceed 1,100,000 on account of the prolonged drouth that affected the island in 1957.

Warehouses and equipment for shipping bulk sugar through the port of Aguadilla will be ready for use in the 1958 crop. This port, situated in the northeastern region of Puerto Rico, will serve nine Centrals, namely, Coloso, Plata, Rio Lano, Soller, Los Caños, Cambalache, Plazuela, Monserrate and Igualdad. These nine Centrals produce about 300,000 tons of sugar per year, and it is estimated that 80% of this sugar will be shipped in bulk. The installation at Aguadilla was built and equipped by Aguadilla Terminal, Inc., a subsidiary of

Central Coloso, Inc. at a cost of about $1,500,000. The capacity of the installation is 700 tons of sugar per hour which would be about one-fourth of the total Puerto Rico production.

An agreement has been signed between Fajardo Sugar Company and Eastern Sugar Company for combining the operations of these two enterprises. According to this agreement, which must be approved by the stockholders of both organizations, all the assets of Fajardo Sugar Company will be transfered to Eastern Sugar Associates, which will assume the obligations of the Fajardo concern. By this action, the Fajardo Sugar Company will cease to exist, and the name of Eastern Sugar Associates will be changed to Fajardo Eastern Sugar Associates. Holders of Fajardo common stock will receive one share of Eastern common stock for each two shares of Fajardo stock, or a total of 179,945 shares of Eastern. When this transaction is completed there will be outstanding 373,693 shares of Eastern common stock, of which 179,945 shares will be held by the former Fajardo shareholders and 193,748 will be held by the present owners of Eastern common stock. Manuel A. del Valle will continue as chairman of the Board of Eastern, and Gunnar Fromen will become president of Fajardo Eastern Sugar Associates. The common stock of Fajardo is registered on the New York Stock Exchange; the stock of Eastern is registered on the American Stock Exchange and the Philadelphia-Baltimore Stock Exchange.

During its 15 years of operation, the Land Authority of Puerto Rico has produced profits amounting to $18,206,196. These profits have been produced in spite of the fact that one of the functions of the Authority is to afford relief to the cane farmers who are entitled to "proportional profits" and in this connection it has been obliged to assume losses by these farmers amounting to $4,985,065. During these 15 years, the Authority has distributed among its laborers, colonos and administrators, $6,469,772, and has increased its capital by the remaining $11,736,772. Besides operating the proportional profit farms, the Authority has charge of the operations of the Centrals Plazuela and Calambache; among its other activities are promotion of the live stock industry, and expansion of pineapple growing to supply a large canning factory recently built at a cost of more than $2,000,000.

Official information published by the Agricultural Experiment Station of the University of Puerto Rico shows that the mosaic disease of sugar cane is now a serious menace to the cane fields of the Island. This new peak of the mosaic disease is due mainly to propagation of B. 34104, a variety which has a reputation for large yielding ability in other countries, but is known to be very susceptible to mosaic. The Station technologists are recommending elimination of the varieties B. 34104 and B.H. (10) 12. They also recommend that all plantings of B. 37171 be carefully inspected and that all stools found to be infected be removed. The varieties recommended as highly resistant to mosaic include the Puerto Rican varieties 980 and 975, and the imported varieties, B. 4362, B. 37172, B. 40105 and H. 32-8560.

Union Negotiations in Hawaii

Sugarmen are watching current negotiations between the Hawaiian sugar industry and the International Longshoremen's and Warehousemen's Union (ILWU), with special interest. It poses several unusual problems, and at a time in which there is increasing indication that sugar unions in many areas are making progress in a cooperation campaign. Therefore, what happens in Hawaii may have definite reaction in many other areas.

The labor contract between 26 of 27 sugar plantations in Hawaii (one does not have a union) and the ILWU expired at the end of last month. ILWU demands center upon a 25¢ per hour wage increase, and up-grading of most labor classifications—with considerably higher base wages than those that existed prior to January 31st.

It is not clear why the union is making such strong demands on the industry at this time. In 1956 the Hawaiian plantations had one of their best years in some time. The industry as a whole made a return of 5.6 per cent on net worth (capital plus surplus). However, 1957 was not as good. Final production figures are an estimated 15,000 tons short of the 1956 crop. Molasses prices also took a drop last year. So, the industry will probably gross $2 million less in 1957 than in the previous year. They estimate this will allow a return of only about four per cent. In 1956 the industry made some $11,107,950 in profits from a net worth of $198,427,369.

Net profits for the more profitable year of 1956 would be swept away by ILWU labor demands, estimated by the industry to cost $12.5 million and by the union at $9 million.

Boyd MacNaughton, president of the Hawaiian Sugar Planters' Association which acts as spokesman for the plantations, has emphasized: "We are not refusing a wage increase. We told the union at the first negotiation meeting that we were prepared to negotiate a wage increase in an amount consistent with the financial situation and prospects of the industry."

Mr. MacNaughton also said that Hawaii's sugar companies have a strong purpose not to bow to the union's demands, and that the industry was ready to take a strike if necessary. He commented that, "otherwise it was committing suicide."

The union has an "ace in the hole" in their bargaining. They also have members of the ILWU working in the warehouse and shipping sections at the huge California and Hawaiian Sugar Refining Corp. in Crockett, California. This is an agricultural cooperative owned entirely by Hawaiian plantations. The union has let the contract with the refinery run out, yet they continue—in this case—to work without a contract. If they don't get what they want in Hawaii they can always tie up the outlet for over two-thirds of the Hawaiian crop.

Outcome of the Hawaiian labor negotiations will be watched with great interest this year.

C&H refinery at Crockett, California, refined 767,000 tons of Hawaiian sugar in 1957—an all-time record. Sales were estimated to be about 760,000 tons, or 4,000 tons below 1956. However, this represents 9.5 per cent of the national total, compared with 9.2 per cent in 1956.

The Experiment Station of the Hawaiian Sugar Planters' Association has added an industrial engineer to their staff. This is thought to be the first engineer of this type to be employed by a private agricultural research institution in the sugar industry. Warren Gibson, who has been with Ewa Plantation Co. since 1947, has been named to the post. Mr. Gibson has been administering a program consisting principally of methods engineering, cost controls, and wage incentives. He has given special attention to irrigation layouts.

Hawaiian Agricultural Company will operate a split off-season this year, which is an unusual procedure in the Islands. The plantation was last to finish their grind in 1957. After a brief shut-down, milling started again the middle of January, and will continue for a month. Then, the second part of the shut-down will be taken. This will run for about seven weeks. The 1958 schedule calls for harvesting 3,484 acres which has some 116.24 tons of cane per acre, yielding about 10.76 tons of sugar per acre. One of the most interesting facts to sugarmen is that the average age of cane will be 32.5 months old.

Freeze Shortens Louisiana Crop

JANUARY 2, 1957:—In the words of Gilbert J. Durbin, General Manager of the American Sugar Cane League, the year 1957 was not a good one for the Louisiana Sugar Industry. "Two hurricanes, too much rain during harvesting time, and two freezes created problems which we would all like to forget." Mr. Durbin stated in a recent interview, and his feelings are shared by everyone in the industry.

A hard freeze visited the entire sugar belt on December 11th and 12th and since that time the race has been on to save as

much of the crop as possible. At this writing, on the second day of the New Year, one Louisiana sugar mill is still grinding. The other forty-seven have either finished their normal cane commitments or have been forced to stop grinding because the canes have deteriorated so rapidly that it is no longer possible to make sugar out of the juice. It is estimated that about five per cent of the crop has been abandoned because of the December 12th freeze.

The 1957 Louisiana cane crop was grown on an acreage which was about fifteen percent larger than the previous crop. Even with this increase, the crop was still confined to an acreage this is seventeen percent less than normal but the sugar people here had high hopes of a good year as they watched the early development of the crop.

The industry as a whole enjoyed a favorable growing season in spite of the two hurricanes referred to by Mr. Durbin and grinding operations began with the canes testing high in sucrose and the experts predicting one of the best crops on record.

Then the rains came and the rains stayed. The crop began to grow again and the sucrose readings tumbled. Because it was not possible properly to burn the canes in the wet fields, trash and mud were hauled to the mills in unprecedented quantities with trash deductions as high as thirty-five percent reported by some of the mills. In addition to the poor production results, the mud played havoc with the milling equipment, ruining the mill grooving and generally reducing milling efficiency.

With normal harvesting weather the 1957-58 Louisiana cane crop should have amounted to about 5,750,000 net tons and the sugar production should have been somewhere near 480,000 tons, raw value. It is now extremely doubtful that the cane production will be any larger than the 4,817,145 net tons produced in 1956-57 and it is practically a sure bet that the sugar production will be less than the 431,000 tons, raw value, produced last season.

We believe at this time it will be interesting to see what has taken place pricewise for the Louisiana sugarcane farmer and mill operator since the 1957-58 Louisiana pricing period began on October 12th.

The Louisiana Sugar Exchange advises us that through January 2nd the average price of sugar for the season is 6.13 cents a pound and the average price of blackstrap molasses is 12.482 cents a gallon. Last season at the end of the corresponding weekly pricing period the average price of sugar was 6.259 cents a pound, and the average price of blackstrap molasses was 25.125 cents a gallon, f.o.b. plantation. This shows that there is a deficiency in sugar prices of about 15 cents a hundred pounds this year as compared with the same period last season, and that blackstrap molasses is averaging approximately thirteen cents a gallon less this season that at the same time last year.

The receipts of offshore raws at New Orleans during 1957, as reported by R. H. Keen & Co., public weighers of New Orleans, amounted to 857,193 long tons of Cuban raws, 22,272 long tons of Puerto Rican raws, 42,097 long tons of Philippine raws, 14,965 long tons of Mexican raws, 14,251 long tons of raws from the Dominican Republic and 12,850 long tons of raws from the Virgin Islands.

The total receipts from all sources during 1957 was 963,626 long tons of raws.

The total receipts from all sources during the previous year was 1,137,446 long tons.

Mexico Protests Quota Reduction

The National Union of Mexican Sugar Producers has vigorously denied a cabled report from Washington which stated that "Mexico is agreeable to reduction of its sugar quota."

"Contrary to what was said in the U. S. dispatch," the Union statement said, "Mexico's sugar industry is not 'happy' about reduction in sugar quotas as arranged by the U. S. Department of Agriculture. On the contrary, we are preoccupied with any reductions for our interest is to obtain higher sugar quotas, more in accordance with the commercial interchange between Mexico and the United States."

The industry as a whole is very much put out by the Washington decision and hopes that it will be a transitory one.

Industry leaders and official statistics of the Department of National Economy both stress that Mexico has attained "maturity" in sugar production and the outlook for 1958 is considered good. The figures reveal that exports approximately quadrupled during 1957, and there will be at least a 15 percent added improvement in 1958, according to the experts.

Sugar exports took a sensational leap, especially in quantities shipped to the United States. During 1957, Mexico sold 44,000 metric tons of sugar to north of the border buyers, with this figure four times greater than the approximately 11,000 tons sold to the U. S. in 1956. Sugar industry executives and the government firmly believe that exports to the United States in 1958 can "easily reach" 50,000 tons.

This boost in exports is not solely limited to the United States alone. Mexico is seeking to expand its markets throughout the world. And official statements here insist this can be done without harming the home market. The feeling is that exports from now on will show a "notable increase."

The 1957 production was but slightly higher than the former cycle, around 12,000 tons in round figures, above the 1,018,000 tons of the 1955-56 cycle. As usual, heaviest production came from the mills located in the states of Veracruz and Morelos.

In the current cycle, which has recently begun, optimistic forecasts speak of production near the 1,200,000 metric ton mark. At this writing somewhat more than half the mills have started working for the 1957-58 cycle. But the figures also show that at least 15 mills (all smaller operations with low tonnage production) have shut down because of "unprofitable operations."

The administration is concerned about the shut downs and wants to get these mills back into operation to boost production figures. Even though the Adolfo Ruiz Cortines regime has but a year more to go, the new administration, probably headed by Adolfo Lopez Mateos, has the same goal: boosting of Mexican exports all along the line.

The administration is committed to a policy of revamping and modernization of old installations, where this is feasible, and the construction of new mills. While this program has been hanging fire, talks with government officials and industry executives reveal that the Republic is in earnest about improving sugar production and export levels.

While nothing official has been released, wider credits for reconstruction will probably be made available next year. And the new administration will continue to give incentive to new investment in the sugar industry.

Meanwhile, from scattered field reports, it is learned that this current cycle has gotten off to a good start. Everywhere mills report "excellent conditions."

Sugar Trends in India

A recent development in the Indian sugar industry is the emergence of more factories on co-operative lines, and according to present plans, Bombay zone alone will have 18 new co-operative factories producing among them 200,000 tons of sugar annually, representing one-elevenths of India's present sugar output. Five factories under this project have already become co-ops. In the next 15 years or so, they will be owned entirely by sugarcane growers, and at such time rural Bombay would have raised out of the savings of cultivators more than $42 million (Rs 200 millions), as capital investment in all the co-operative sugar producing units.

For the purpose of forming one co-operative sugar factory, 1,200 growers in 25 to 40 contiguous villages having 3,000 acres under sugarcane are brought under a co-operative society. The capital required is found partly by the farmer, partly by the State, and by loans obtained on deferred payment terms. While the grower pays only a nominal amount at the outset, in subsequent years he is

(*Continued on page 47*)

Sugar's Progress in

HUMAN RELATIONS

Roy J. Leffingwell

WHAT IS HUMAN RELATIONS?

One of our readers asked, "what is human relations?" This is a good question, and one that should interest sugar people the world over.

It should interest sugar people because this industry requires the employment of many human beings. And human relations is a field of research, teaching and practice dealing with human beings. It is a field of learning and practice, just as medicine. One big difference is that human relations has been the subject of systematic study for only some 25 years and medicine has had some 2,500 years.

But, why should you be interested in human beings, even though you must work with lots of them? This question can be answered by a statement Dean Stanley F. Teele of the Harvard Business School made recently. As this institution is highly regarded throughout the world as an authority in business, the comment is significant. Dr. Teele said "As we have learned more and more about a business organization as a social unit, we have become increasingly certain that the executive's skill with people—or lack of it—is the determining element in his long-range success or failure."

So, if your success with people determines how you make out in business, it is well that you learn all you can about them. This is the study of human relations.

Human relations has its roots in the work done by Elton Mayo, Fritz Roethlisberger, and L. J. Henderson at Harvard University in the 1920's and 1930's. Today, interest in research, teaching, and practice in this field has spread throughout the free world, at least.

One contribution of human relations research points up some of the regularities in the way people behave. It has been found that human beings act very much the same in Europe, the U. S. and India. Without uniformaties in human behavior, learning from experience would be impossible, and the idea of organization itself would be nonexistent.

If you want to keep a gasoline moto rrunning you have to learn how to operate it, or pay someone to do it for you. Likewise, in dealing with human beings you must learn how best to deal with them, or pay someone to do it for you. Human beings are not born with the knowledge necessary to handle motors, nor people. And, research has proved that experience is a poor teacher in the field of human relations.

It is hoped that this gives the reader who asked the question some general ideas about human relations. Any further questions on the subject will be welcome.

It is interesting to see how much more productivity is possible where human relations practices are used in an organization. And, employees are invariably happier.

Starting Next Month—A Series On Employee Benefits

Starting next month, a new feature on this page will be devoted to one of the many employee benefits now being given in sugar areas of the world.

Here is the schedule:

March—"Group Insurance"
April—"Health & Medical Plans"
May—"Credit Unions"

We need your help to make this feature of maximum benefit. Ideally, we would like to show how each sugar area in the world is participating in these various forms of employee benefits. But, we can't do it, unless you write us and let us know what you are doing in various areas. So that you will have sufficient time to send in your material we list above the subjects to be discussed three months in advance.

Obviously, for the first two months you won't have three months time. But, until we catch up, please hurry your information to us.

We have some good material from Cuba and Australia on "Group Insurance," but we need information from you as to what your area is doing about this subject. Write us today.

A 35% increase in productivity has been experienced through the use of moedrn safety methods. The Tennessee Coal & Iron Division of U. S. Steel Co. reports a drive was started seven years ago to eliminate faults that hindered safe haulage of coal and iron from the mines. (This hauling operation is not too unlike cane hauling from fields to the mill). Through mechanized construction methods, and improved rolling stock, hauling accidents were reduced 66%. Engineer safety into an industrial operation and you are bound to improve production, say company officials.

A shortage of trained workers has had a depressing effect upon recovery figures in the new Banbung mill in Thialand. Construction of the plant was finished December 6, 1956. Its first crushing campaign lasted until April 7, 1957, a total of 123 crop days.

The cane is harvested by hand and taken to trucks or rail cars by manual labor or ox carts.

Toronto's (Canada) first sugar refinery, scheduled to open next year, will be a model of automation. No human hand will touch the sugar from the time it is unloaded from ocean-going freighters until it reaches the plant's shipping department, a refined and packaged product.

It has been estimated that the full mechanization of a farm increases the food and fiber production for human consumption by about 15%. This is in addition to the great increase in man-day productivity for each worker using new tools.

Australia is experiencing the growing pains which go with the change from "extensive" to "intensive" production. In the past they have followed the pattern of frontier areas with broad acres and emphasis on production per man. They are now passing into the stage when, with increased pressure for land, they are promoting emphasis on production per acre.

Olaa Sugar Co., in the Hawaiian Islands, presents an excellent case study of what happens when mechanization is put into operation. Olaa was one of the last plantations in Hawaii to adopt mechanization in field operations. In 1952, when all of their cane was harvested by hand, it required 2,279,932 man hours to produce 53,738.44 tons of sugar. This works out to 42.43 man hours per ton. In 1956, with 100% mechanical harvesting, it took only 1,252,216 man hours to product 51,090 tons of sugar —or 24.51 man hours per ton. This is a saving of over 42% in manpower in harvesting. Machines were able to do the work of 500 cane cutters and broomers with only 117 employees.

Lihue Plantation on the Island of Kauai in the Hawaiian group, has a new contest for kiddies of the community. The plantation is the last of the Hawaiian companies to convert their cane hauling from railroad to truck. With 12 new Kenworth trucks the youngsters within the employee-families will be given $5 each for the best truck name, accepted by the company.

Salk anti-polio shots are being offered by Hawaiian sugar plantations to employees, as part of the joint company-union medical plan. Typhoid and tetanus immunization are also available.

Dextran and Asiatic Gums

Surplus Sucrose in Oilwell Drilling

By Wm. L. Owen

Wm. L. Owen Laboratories
Baton Rouge, La., U.S.A.

In the past century there have been various transitions in the rank of products produced from sucrose or molasses for industrial purposes. At one time the primary industry for the use of molasses was industrial alcohol while today there is probably not more than a third of the 300,000,000 gallons of molasses once used for this purpose now converted into ethyl alcohol in this country. After the decline of the ethyl alcohol industry as a market for blackstrap there arose another great industry based largely upon molasses as a raw material, and that was the butanol and acetone industry that reached its peak in the third decade of the present century. Then, there was developed the citric acid process utilizing some molasses but more sugar.

A typical drilling well. The use of dextran in these operations may open an important market for a sucrose by-product. Suitable substitutes for other exotic gums have been made from sugar by-products as described in the accompanying article.

TABLE I.*

Gum	Source	Potential Markets	Market Prices	Usages
Algin	Seaweed	8,000 tons sold annually in U.S.A.	80¢ to $1.00 per lb.	Emulsifying, suspending, jellying, thickening and bodying agent (especially as a stabilizer for ice cream); in food products of a foam, jelly or emulsion nature; cakes icings, chocolate milk and whipping cream; hand emollients; addition to boiler feed water to prevent incrustation; sizing materials; pharmaceuticals.
Arabic	Acacia tree	7,000 tons sold annually in U.S.A., 30,000 tons throughout world	11 or 12 cents a lb. crude form 14 to 15 cents a lb. powdered form	Adhesives, polishes; confectionery; printing textiles, paper size; inks and pharmaceuticals, paints.
Karaya	Stericulia tree	1,300 tons imported in 1948	36 cents a pound	Textile, cosmetics, food and other industries.
Locust bean	Locust tree	1,200 tons imported in 1948	29 to 31 cents a lb. in powdered form	Paper and textile industries.
Tragacanth	Astragalus plant			With acacia, as an emulsifying agent; textile industry cosmetics; pharmaceuticals; coating.

* Data in the table furnished by the Innis, Speiden Company, New York, and Dr. C. L. Mantell in his excellent book on "Water Soluble Gums".

Currently the great demand for molasses seems to be in its earliest use, and that is for cattle feed. Other industries, of course, take their share of the annual molasses crop; among these are the yeast industry, the acetic acid industry and to a lesser extent the lactic acid industry using molasses as a raw material. United States Department of Agriculture marketing reports state that the mixed feeds industry now has supplanted and surpassed fermentation alcohol as the greatest user of cane molasses.

The reason for the rise and decline of these industrial empires has been the continued advance of chemical syntheses, as exemplified by the almost complete absorption of the ethyl alcohol and butyl alcohol industry by synthetic alcohols, so much so that the sale of synthetic ethanol far surpasses that of the fermentation variety.

On the other hand synthesis is responsible for one of the most promising of all the new usages for sucrose and one that may well rid the industry of the bogey of over production and surplusages, and that is in the production of sucrose esters and of detergents produced from them.

But it is to the production of gums from sugars that we may expect the greatest absorption of surplus sucrose, for the industries which absorb these products use and demand it in substantial volumes. For example, dextran, once the nemesis of the sugar industry on account of its viscosity and its resistance to clarification and the filtration of sugar liquors in which it occurs is now in great demand by the oil well drilling industry, owing to precisely those vices that were so much dreaded by the sugar manufacturers especially in Louisiana. For what the oil well drilling industry has been seeking for years is an effective retardant for the loss of water from drilling fluids and dextran had proved to be ideal for that purpose. At Central Espana, Cuba a pilot plant has been in operation under the Owen patents[1] and has been producing two tons of dextran per day. As of this date over 100,000 pounds of this dextran has been imported into this country for oil well drilling fluids. This one pilot plant is probably consuming as much as five tons of sugar per day, and if the demands of the petroleum industry are to be met this production will have to be stepped up to 25-50,000 tons. And this is for one industry alone. These fermentation gums, most of which may be substituted

[1] U.S. Patent No. 2,392,258, Wm. Ludwell Owen, and Wm. L. Owen, Jr., Jan. 1, 1946. U.S. Patent 2,360,327, October 17th, 1944, Horace Bailey, Wm. L. Owen.

for the vegetable gums which are imported from the Asiatic countries, and which are used for cosmetics and in foods, in adhesives and textiles, may find an almost inexhaustible market in this country. The writer has given some figures on consumption and usages for these vegetable gums in an earlier article appearing in this journal, but it may be appropriate to present them here.

It will thus be seen that approximately 18,000 tons of these gums were consumed in the U.S. ten years ago, and the amount is probably much higher today. But fermentation gums from sucrose may exceed all of these, for if it supplants only one-half of the volume of starch now used for oil well drilling fluids, which is estimated at 100,000,000 pounds annually it would require 25,000 tons or more than all of the gums now being consumed.

As a blood plasma extender and as a colloidal additive to the oil well drilling fluids the production of dextran has a bright future before it which will undoubtedly make it a growing industry the world over, and its newly established value in the oil well drilling industry should more than ever assure its prominence.

But the success of dextran is perhaps only a beginning, for there are other promising gums that may be derived from sucrose, such as levan, levulan, cellulan, etc. While none of these products have been produced industrially, levan has properties that might make it suitable as a supplement to the high viscosity gums such as dextran. As an adhesive it might well find a place as a substitute for gum arabic in certain pharmaceuticals, and as this gum is imported from the Sudan, a domestic supply would be a great boon to U.S. industry. Since the formation of the gum arabic from the Acacia tree is the result of a pathological infection of the tree and demands a certain condition for its formation, the annual yield is variable and the supply undependable.

But in addition to these fermentation gums that are being produced from sucrose there are gums that may be recovered from blackstrap and even filter press muds which when chemically treated with aldehydes may serve to displace some of the crude gums now in use in oil well drilling and other industries.

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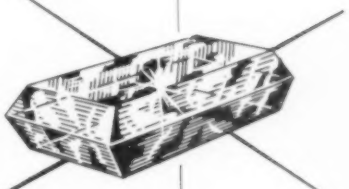

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1958 Sugar Outlook

(Continued from page 36)

spot U. S. price. Despite repeated Cuban assurances, there undoubtedly were some fears that U. S. quota sugar might be diverted to the world market. At least, it put foreign suppliers of the U. S. market in a very strong bargaining position.

This situation is not expected to be repeated in 1958, unless international political developments grow worse, or Cuban cane destruction becomes statistically serious. However, the domestic spot price probably will not average much below that of 1957, even though total U. S. quota supplies and inventories appear to be higher than anticipated normal demand for the country as a whole .This anomaly, nevertheless, may again result in price weaknesses in the more competitive areas of the country.

As refiners' costs show little indication of decreasing, except for possible increased production volume, it seems reasonable to assume that the spread between raw and refined prices in the Northeast in 1958 will be substantially maintained at around 1957 levels.

■

New Stubble Clearer

A soil pulverizer that could be built for approximately $2,000 consisting of four revolving vertical discs, 18 inches in diameter, each containing right angle blades which chop soil and cane stubble has been developed at Louisiana State University. The machine, designed by William T. Carter, agricultural engineer, with the cooperation of Edwin C. Simon of the LSU Sugar Station staff, is intended to be drawn and powered by a tractor and will pulverize a strip 20 inches wide and six inches deep, which is sufficient to clear a row of cane stubble. The pulverizer, in one operation will do the work of three implements and three operations using conventional implements, says the LSU announcement.

■

Zerban Group Hears Daniel Wadsworth

Daniel V. Wadsworth of Refined Syrups & Sugars, Inc., addressed the monthly meeting of the Zerban Sugarmen's Association at the Chemists Club in New York on January 8th. Mr. Wadsworth spoke about the early conception of bulk sugar handling, particularly in liquid form, and related some of the technical and financial trials that beset the small original company that later developed into the Refined Syrups & Sugars.

The next meeting will be held on February 12. Sugar men visiting New York are always welcome at the monthly meetings.

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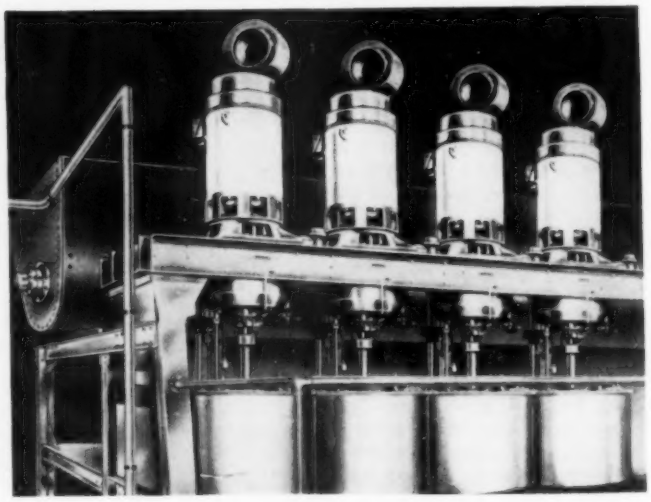

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Facts About Sugar

(*Continued from page 41*)

able to repay loans out of his own savings and become master of a unit involving an investment of more than $2 million. The growers will sell cane directly to the factory, and each unit will provide work for about 1,500 persons.

During the Suez crisis, Indian sugar had a profitable export market; with world prices considerably lower now, fears are expressed that Indian sugar may not be able to stand competition abroad without some subsidy. In brief, India's sugar exports are somewhat precarious and 'temporary.' India's hold on Malaya and Ceylon is weak, as British refined commands a high market here as usual.

Assuming the total production in 1957-58 to be around 2.2 million tons and domestic consumption at 1.8 millions, latest estimates indicate the exportable surplus this year at 400,000 tons. But with international prices at around $112 per ton against $182 to $196 that prevailed a few months back, exports will result in a loss of nearly $25.25 million.

Although part of the prospective loss from exports might perhaps be met from the special fund created by the industry out of its profits in foreign sales in the past year, the fund is unlikely to meet the whole loss. The Indian Sugar Mills' Association which has sold till mid-November 172,000 tons of sugar for export, has been able to ship 140,000 tons so far.

The Association has finalised a novel scheme for implementing sugar exports this year, and this visualises the establishment of an export corporation by the I.S.M.A. for handling the export trade in accordance with the directions from the Government. The scheme also suggests that the Association should ask member-factories to reserve 10 per cent of the output during this season for export through the Corporation and to pay to the Corporation Rs 2 per maund (.52 cents per pound) on the entire production of the season for subsidising sugar exports. In order to make good the loss of Rs 2 per maund for the factories, the internal prices of sugar will have to be stepped up to this extent. While probably the Government might be inclined to "wink" at the expected increase in internal prices, it will not be willing to declare the increased price as a controlled price. Export sugar already gets a concession of about Rs 11 per maund ($3.25 per cwt.) by way of tax and freight benefit.

The proposed export corporation will thus collect by way of export subsidy about $25 millions (Rs 118.8 millions) for the 2.2 lakh tons reserved for export (on the basis of Rs 2 per maund on the total output of 22 lakh tons). This works out to Rs 20 per maund (about $5.90 per cwt.) and with the tax and freight concession of Rs 11 per maund, the scheme would allow Indian sugar being made available for export at about Rs 2.50 to Rs 3.00 (about 65 cents) per maund of 82 pounds. This will mean that Indian sugar can be sold in markets as far away as England at Rs 5.50 to Rs 6 per maund (about 1.75 dollars per cwt.) inclusive of ocean shipping cost. The I.S.M.A. scheme will mean that 90 per cent of the current season's output will have to be sold to domestic consumer at about Rs 36 per maund (ex factory) uniformly throughout the country, each factory being assured of this price. The subsidy to help exports is not favoured by the trade or industry, and therefore a general quota, allowing individual factories to export on their own account taking advantage of the freight and tax concessions has been suggested in some quarters.

The real trouble with the Indian sugar industry is its high cost of production. Because of the fixed price for cane which protects the grower, the manufacturer and consumer have to subsidise cane production in sub tropical areas. The crushing season and recovery percentages are other factors, but these are of less importance than the appreciably high prices paid for cane. However, factories with home-farms are obviously well-placed.

Officers of the American Society of Sugar Beet Technologists, meeting in Detroit in technical session on February 4th. Left to right, James H. Fischer, secretary-treasurer; Austin Armer, president; Frank A. Rawlings, vice-president.

Record U. S. Beet Harvest

An all-time record crop of 15,379,000 tons of sugar beets is reported by the Department of Agriculture. Previous record was 13,766,000 tons harvested in 1954. This huge 1957-8 crop was raised on 883,000 acres, at least 70,000 acres less than total acreages harvested in some previous years when substantially less sugar was produced. The Department's figures are based on a state-by-state survey of farms and processing companies. Yield also set a new record, amounting to 17.4 tons per acre compared with the old record of 16.6 tons per acre established last year. The beet crop will account for 2,010,000 tons of sugar, 125,000 tons more than the former record established in 1950.

■

Albin J. Stevens

Albin J. Stevens, retired General Superintendent of Central Buena Vista, Argentina, died last December at his home in Baton Rouge, La. A graduate of Louisiana State University, Mr. Stevens served as Assistant Superintendent of Central Hershey in Cuba from 1920 to 1926. Until 1932, he was Superintendent of Centrales Baguanos and Tacajo of the Antilla Sugar Company. In that year, he become General Superintendent of Buena Vista where he remained until 1952 and his retirement on account of illness.

During his years in Argentina, Mr. Stevens also organized the engineering firm of Stevens & Villasuso which is still in operation.

SUGAR ABSTRACTS

Published under the Auspices of the International Society of Sugar Cane Technologists by Special Arrangement with SUGAR y AZÚCAR — Dr. O. W. Willcox, Editor

Agriculture

Electro-Dusting of Crops

N. G. SHREEVE, *World Crops*, Vol. 5, No. 9, pp. 205-206 (1957).

The firm Agricola Plant Chemicals, Ltd., has devised equipment whereby the particles of powdered insecticides and fungicides may be given a positive charge of static electricity. On contact with the plants the particles so charged generate a negative electric charge and cling to the leaf surfaces in spite of wind or other adverse conditions and their protective action is much greater than that of uncharged particles. This allows a considerable saving in the quantity of powder to be used; besides the more complete and uniform coverage of the leaves on both their upper and lower surfaces, the dust stays on longer and the period of protection is lengthened.

■

"Bacterial Mottle," a New Cane Disease

D. R. L. STEINDEL, *Cane Growers' Quarterly Bulletin*, Vol. 21, No. 1, pp. 6-8 (1957).

A new cane disease has been found to occur in low-lying areas, and frequently appears in ratoon crops that have been flooded as plant cane. Early symptoms consist of creamy white, regular stripes one to two mm. wide extending from or near the base of the leaf parallel with the vascular bundles. Orange to rusty-red areas develop later. At this stage the symptoms resemble those of downy mildew at an advanced stage of development. Finally the leaves wither and curve inwards and the whole shoot dies. Diseased plants produce numerous side shoots at the base. Microscopic examination of diseased areas show immense numbers of bacteria which are rod-shaped organisms with a number of flagella and resemble the erwinia group. The disease is very destructive when the plants become infested. The varieties Q.57 and Trojan appear most susceptible, but has also been found in Badila, Comus, Eros, and Q.45. (See pages 37-38: Edit.)

■

Host Plants That Carry the Virus of the Stunting Disease of Sugar Cane

R. J. STEIB and I. L. FORBES, *Sugar Bulletin*, Vol. 35, No. 23, pp. 375, 379 (1957).

In experiments conducted in the greenhouse here it has been found that Johnson grass and corn plants which have been inoculated with the stunting disease virus showed no external symptoms of this disease, but when juice from these plants was inoculated into cane plants, symptoms characteristic of stunting appeared.

This information is of importance because there is strong evidence that the virus may be spread to sugar cane by farm implements that have come into contact with old Johnson grass rhizomes. It is therefore recommended that treated seed, and progeny from treated seed for establishing disease-free cane nurseries, should be planted in fields that are free from Johnson grass.

■

Fertilizing Sugar Beets by Spraying the Leaves

ALLEGRO GIARDINI, *Industria Saccarifera Italiana*, Vol. 50, No. 7-8, pp. 165-168 (1957).

A large scale and well replicated test was set up by the Italian Sugar Producers Association on a productive clayloam soil to compare the effect of a mixed fertilizer applied to the soil or applied to the leaves. The test was a split-plot design which included treatment or no treatment with copper oxychloride spray to control Cercospora. The soil of the fertilized plots was given a 14-13-20 mixed fertilizer applied in the usual manner; on the plots to which no fertilizer was added, the same mixture was sprayed on the beets 15 days after emergence and again after two 15-day successive periods.

The directly fertilized plots gave a significant increase of yield over the unfertilized control plots, whereas the spray treatments produced no perceptible increase. These results appear to negate the possibility of increasing the yield of sugar beets by feeding fertilizer through the leaves. Incidentally, the treatment with copper spray substantially increased the yields independently of the presence of added fertilizer in either way.

■

Technology

Use of Depolymerized Paraformaldehyde to Control Microbiological Infections in Continuous Diffusers

R. E. HALLBECK, *Journal of the American Society of Sugar Beet Technologists*, Vol. 9, No. 4, pp. 313-315 (1957).

Formaldehyde in solution is commonly used to control bacterial infections in beet diffusers. The solid polymer, paraformaldehyde, of this chemical can be depolymerized to give a water solution of formaldehyde; since paraformaldehyde is cheaper it is more economical.

It is not desirable to add solid paraformaldehyde directly into the diffuser because it goes into solution slowly and so does not immediately exercise bacterial control; for this reason it should be dissolved in water and the solution stored for use as required. At Woodland (Calif.) factory the practice is to dissolve 100 lbs. of solid paraformaldehyde by adding three ounces of caustic soda to 140 gallons of water at 90°C and then adding the paraformaldehyde with stirring; live steam is injected for one and a half minutes and the temperature of the mixture is then allowed to drop to 64°C. Depolymerization is complete in 23 minutes; the added caustic soda gives the solution a pH of 10. The solution is made and stored in a tank of about 200 gallons capacity

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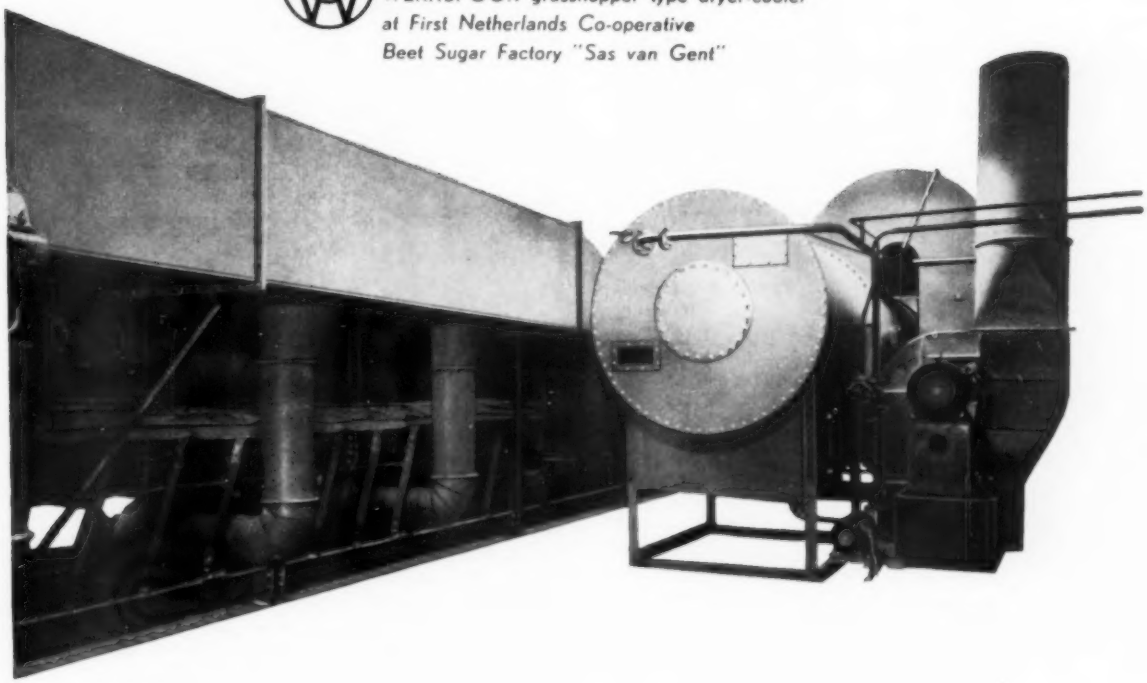

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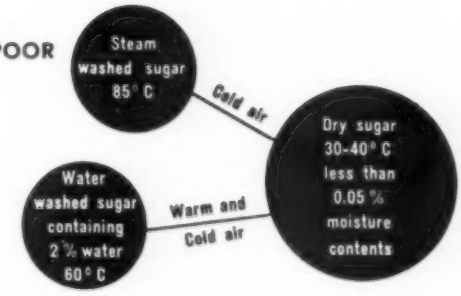

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(which should be covered and provided with a vent to the outside if located indoors). The tank should be provided with heating and stirring means, and a pump and pipes to carry the disinfectant to desired points of application. The solution as thus prepared will contain about 10% of formaldehyde. The cost of this solution is only half as much as that of commercial liquid formaldehyde.

■

Disposal of Molasses Distillery Slop

G. GUNDU RAO, *Indian Sugar*, Vol. 7, No. 4, pp. 265-269.

At the Daurala Distillery the slop is diluted to 12 times its volume with distillery condensate or factory waste water or well water, and conducted by a lined ditch to adjacent farm land. The area of land required to absorb the distillery's 50,000 gallons of slop per day is 150 to 200 acres. The results have been remarkable. There is an incessant demand from the farmers for this water and they are willing to pay for it. It is found that one heavy irrigation with diluted slop followed by three or four light ones does away with the need of fertilizer for a good yield of sugar cane. In fact, if used too liberally the cane crop is likely to lodge badly.

Some consideration is given to adopting the practice of sulphite pulp factories that ferment their waste liquors for yeast or alcohol and concentrate the slop to 55% solids in a multi-effect evaporator, from which the primary condensate serves as boiler feed. The concentrated liquor is burnt in the boiler furnace by a special type of rocker burner.

■

Starch Content of Raw Sugars

AKIRA INUMA, *Proceedings* Research Society Japan Sugar Refineries' Technologists, Vol. 5, No. 12, pp. 72-77, 1956. (English summary.)

The starch content of raw sugars was determined by the Balch method. A summary of the results is given as follows:

Raw sugars	*Starch content %*
Taiwan (Formosa)	0.06-0.123
Australia	0.07
Reunion	0.024
Peru	0.021
Brazil	0.018
Philippines	0.017
Indonesia	0.008
Cuba	0.005

Starch in raw sugars cannot be removed by common juice-purification operations such as the carbonation process or by use of active carbon, bone char, or ion exchange resins, and can be detected in refined sugars manufactured from such raws. Much difficulty has been experienced in processing the relatively starch-rich raws from Formosa and Australia.

■

Speeding Up Pan Cleaning

C. G. M. PERK, *South African Sugar Journal*, Vol. 40, No. 9, p. 715 (1956).

This new pan-cleaning procedure involves the combined action of exhaust steam and water. After dropping of the strike, an exhaust steam valve in the top of the headbox and a spray-water valve are opened simultaneously. Because of the high position of the steam inlet, the save-all and its drain pipes are steam-cleaned, and even the air in the top part of the pan is replaced by steam, thus insuring quick and easy restoration of the vacuum by the air pump when the pan re-starts. Hot fine-screened water under pressure (condensate from the last vessel at 60-90 p.s.i. g.) is sprayed from the center of the vapor entrance of the save-all. The nozzle is so designed that the cone of dispersed water has an apex angle of at least 120°. The screen can be cleaned while the pan is in operation by means of a second stop valve between the screen and the pan. Cleaning time is reduced by this method from 15-20 to 5 minutes.

■

Handling Cloudy Filtrate

T. LOWE, *Sugar Journal*, Vol. 19, No. 5, pp. 34-44 (1956).

The cloudy filtrate from the Oliver filters is treated with 50 lbs. of Hy-Flow filter aid per 5,000 gallons, heated to 190°F., limed to pH 7.8 and passed through a "Fas-Flo" filter. The bright filtrate is sent to the evaporators and filtration is continued until pressure builds up to 40 p.s.i. The unfiltered juice is drained off, the residual juice is displaced by compressed air, the cake is removed by compressed air and run to waste. Filtering requires about one hour; preparation for the next cycle occupies 45 minutes. Capacity is 9,000 to 12,000 gals./24 hours, operating costs about $25 per day.

This filter is of material assistance in overcoming clarification difficulties in periods of bad weather when dirty cane is being delivered, and the cloudy filtrate does not have to be sent back to the clarifier, with consequent disturbing effects.

■

Triple Seed System in a Sugar Factory

LUIS LOPEZ CARSOLIO, *Proceedings* of the 9th Congress, International Society of Sugar Cane Technologists, 1956.

In a raw sugar factory that also produces refined sugar it is of importance to obtain the raw sugar in the form of large, light colored crystals that drain well and may be washed with little water. The process used is basically the same as the "double Einwurf" system mentioned in Lyle's "Technology for Sugar Refinery Workers" (2nd edition). Under the circumstances prevailing at Ingenio del Monte in Mexico it appeared logical, and could solve the chronic problem of lack of equipment for double purging the raw sugar that passes to the refinery. The system is as follows:

A "C" strike for seeding purposes is made according to the Gillett method by injecting finely powdered granulated sugar into a mixture of "A" washes and syrup: this gives footings for three "C" massecuites, which are run to crystallizers and, as needed, give footings for strikes from "B" molasses, which are discharged into crystallizers provided with agitator and cooling—heating coils.

The central idea in this process lies in the method for controlling the centrifugal work of the "C" centrifugals. Prior to the new arrangement the practice was to pass the "C" strikes to the centrifugals in the order in which the crystallizers were filled: in other words, all strikes were allowed the same "retention time" in the crystallizers. This practice is illogical because no two strikes have exactly the same viscosity, temperature, density, size and number of crystals, and each of these variants has its influence on the rate of crystallization and consequently on the time required to complete the crystallizing process. To meet this objection, under the present system samples are taken at intervals of eight to ten hours and the purity of the mother liquor is determined; then the massecuite with the lowest purity

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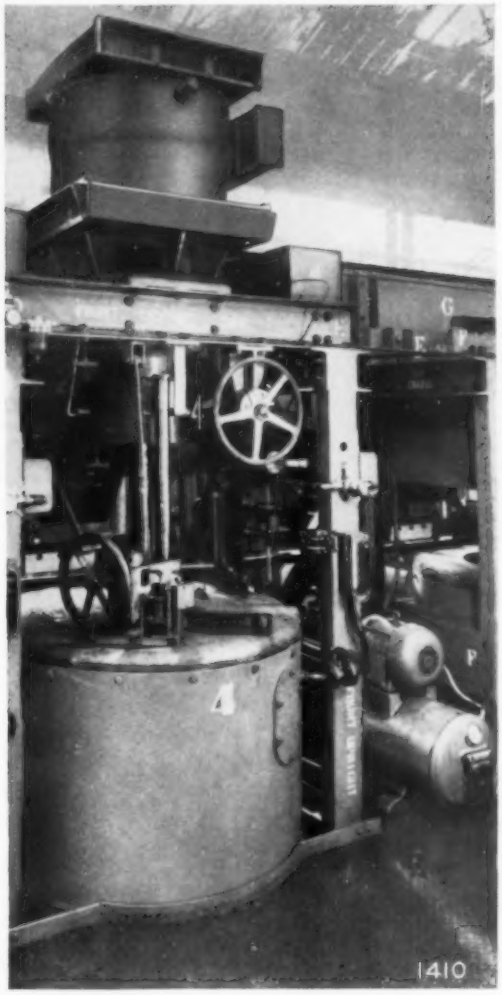

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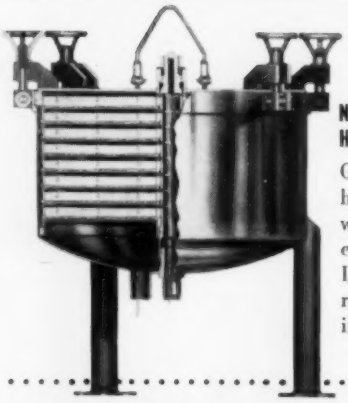

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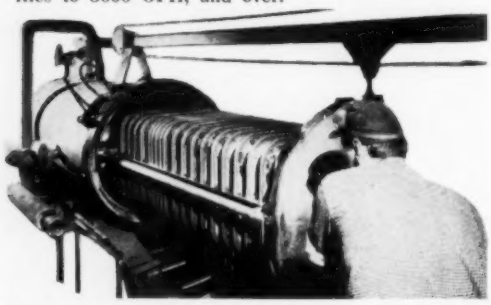

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is centrifuged first. This allows strikes with "low exhaustion velocity" more time to become "ripe," with benefit to the factory's efficiency.

Continuing the "triple seed" system, the unwashed "C" sugar is mingled with "A" washes and the magma is stored in a crystallizer as footing for a "B" strike which is finished with "A" syrup and sent to a crystallizer. The unwashed "B" sugar is mingled with syrup, the magma is sent to a crystallizer from which footings are taken for "A" strikes. These strikes, well washed, pass to the refinery as raw sugar and are characterized by their large crystals.

The results of four consecutive crops show that this arrangement, consisting in crystallizing syrup and "A" washes to obtain footings for both "C" and "B" strikes, is superior to the former system. The advantages are: no recirculation of syrups, which improves factory efficiency and saves heat; separate graining is avoided, all strikes being made on seed grain, which gives better control of vacuum pan operation and an increase of the equipment's efficiency; the raw sugar passing to the refinery is well purged and washed because the crystals are always of good size. There are savings in active carbon and filter aid, a significant increase in filtering capacity and improvement in the quality of the product are obtained.

■

Nature of Sulfuric Acid-Activated Carbon (Ion Exchange Active Carbon) and Conditions for Its Preparation

MASAHIKO KOMOTO, *Proceedings* Research Society Japan Sugar Refineries' Technologists, Vol. 5, No. 12, pp. 49-71, 1956. (English summary.)

The raw material was sawdust (cryptomeria). The activation process is as follows: One part of sawdust is dumped with stirring into three parts of 85% sulfuric acid at a temperature of about 90°C. In about two to three minutes the temperature rises to 155°-160°, with evolution of steam and sulfur dioxide gas. Only about ten minutes is needed for activation. The reaction product, which is granular, black, and relatively dry, is countercurrently washed with water until free from sulfuric acid, and is thoroughly pulverized by wet grinding. The obtained carbon has about 72% moisture and the yield of active carbon is about 70% (dry basis). The product has been named "Ion-Exchange Active-Carbon" (I.A.C.) as it has both decolorizing and ion exchange powers. About 82% of the sulfuric is recovered in the form of a 70 solution of H_2SO_4.

I.A.C. contains—SO_3H—COOH (and/or phenolic—OH) groups in the ratios of about 20 and 80%; its maximum capacity of ion exchange is exhibited at a pH of 6-7. The powers for decolorizing and ion-exchange seem to be independent of each other. Its capacity for removing color from solutions of caramel, methylene blue, molasses, and washed-sugar liquor lies between that of carboraffin and Standard Norit. The finished product has a pH of 3.0 and has a tendency to lower the pH of sugar solution; to prevent inversion of sucrose in a washed-sugar liquor it is necessary to raise the pH of the liquor to 8.9 by liming the liquor before adding I.A.C. (about 0.5% on Brix). In such case, the decolorizing and deashing effects were about 60% and 27%, respectively. The deashing per cent for affination syrup (3 on Brix) was about 24%; removal of Fe, Ca, Mg, and K follows the Schultze-Hardy law. True purity is raised about one unit.

Filtration rate of the affination syrups or washed-sugar liquors treated with I.A.C. is greater than of those treated with other commercial active carbons; the filtrates were clearer and more brilliant. When dried or allowed to dry out in storage I.A.C. loses some of its decolorizing power, but its ion exchange capacity does not decrease. Within three days of storage it keeps its decolorizing power perfectly; after that, further drying reduces this power

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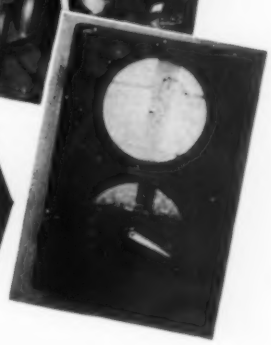

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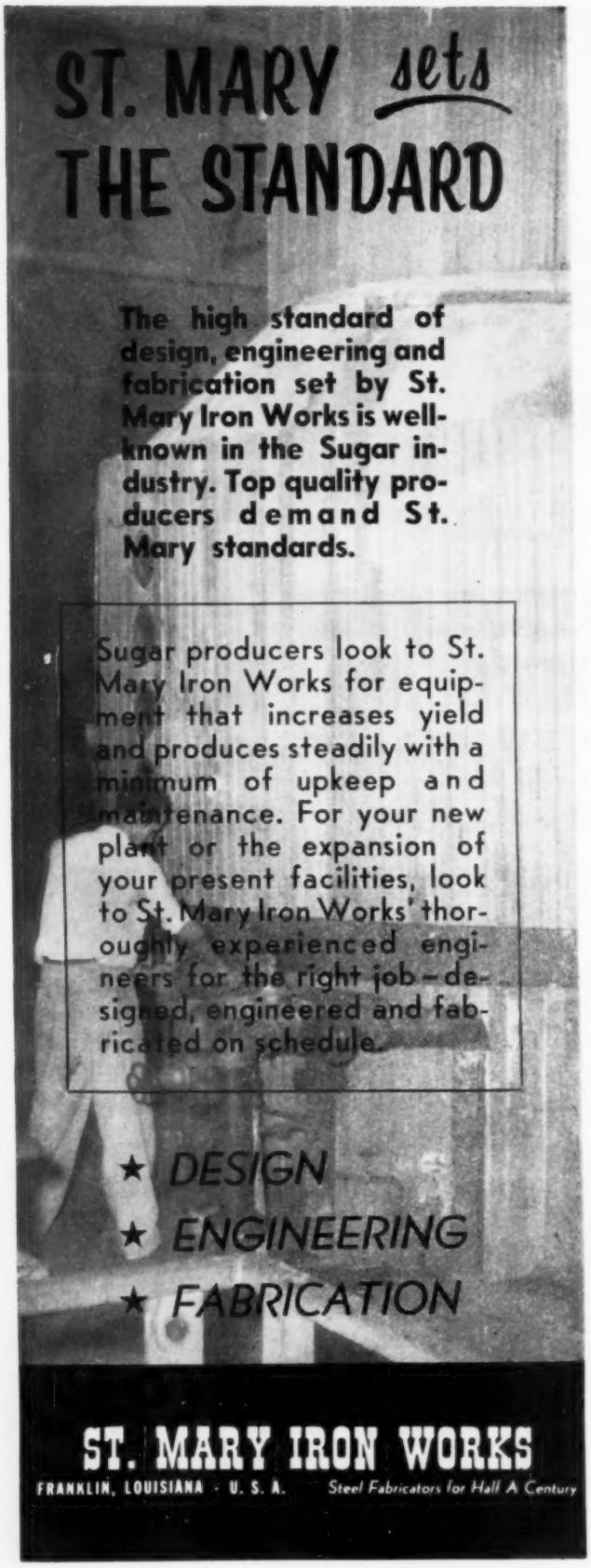

to about 11%. The unwashed reaction product, containing much unreacted sulfuric acid, retains its decolorizing power permanently, or for at least five years. The exhausted I.A.C. can be regenerated by washing and treatments with caustic soda and hydrochloric acid. Sulfuric acid, recovered from the original process, can be used for the final regeneration. Good results were obtained by using I.A.C. in combination with carbonation for the clarification of washed-sugar liquors.

■

Harmless Water for High Pressure Boilers

C. ALLEN, *South African Sugar Journal*, Vol. 40, pp. 807-808 (1956).

A quadruple effect evaporation has been installed at the Plaistow Wharf refinery of Tate & Lyle to provide feed water for two high pressure boilers. Steam from an external source, reduced from 650 p.s.i. to 251 p.s.i., enters the calandria of the first cell of the quadruple effect, where it evaporates softened town water; vapor from this first cell enters the calandria of the second cell, and so on. Vapor from the fourth cell, now at 70 p.s.i. passes into the 70 p.s.i. main for process steam. The result is that the condensate in the calandrias of the syrup evaporators is virtually distilled water, and there is no danger from deposits of scale that would impede transfer of heat. The metal of the steam boilers is protected from corrosion by boiling off most of the oxygen gas under vacuum in a de-aerator. The last traces of oxygen are removed by treatment with sodium sulfite.

■

Cane Payment on Quality Basis in India

B. L. MITTAL, *Indian Sugar*, Vol. 7, No. 3, pp. 971-973 (1957).

In many countries sugar cane is paid for on the basis of its content of sugar, determined by analysis of each lot as delivered at the factory. In India the installation of this system would be affected by extraordinary difficulties, arising from the fact that the number of cane growers is very large who cultivate cane on very small plots of land. In the territory of a typical Indian sugar factory (1000 tons/day) there may be about 20,000 growers. In a season of 150 days a total of 150,000 tons will be crushed, so the average per grower is 7.5 tons from an average field of half an acre. The sugar content of this cane varies between 8 and 13%. It is obviously irrational to pay all farmers the same price. The factory suffers an inconvenience, in that since the growers are paid by the ton they insist on planting only the late maturing varieties which are high tonnage yielders and they neglect the early and intermediate ripening varieties; this limits the factory to a short campaign and raises the cost of producing sugar.

Under these circumstances there is needed a practicable method of analyzing, separately, the cane of each small grower. The method under consideration at the Indian Institute of Sugar Technology is that the whole area from which cane is to be delivered to a certain factory should be surveyed just eight days before grinding is begun. This survey would be conducted by a man (with an assistant) trained in the use of the hand refractometer. Preliminary experience has shown that the surveyor can cover 400 acres in eight days. Juice samples will be taken from five to ten stools from farms of one to twelve acres. Results of the tests will be classified into groups showing about the same Brix, variety, and health of the crop, and arrangements will be made to deliver cane from each group on the same day. During this day a test run of 100 tons of cane will be run and payment will be made according to the results.

A planned system for putting the scheme into effect indicates that the expense will be relatively moderate.

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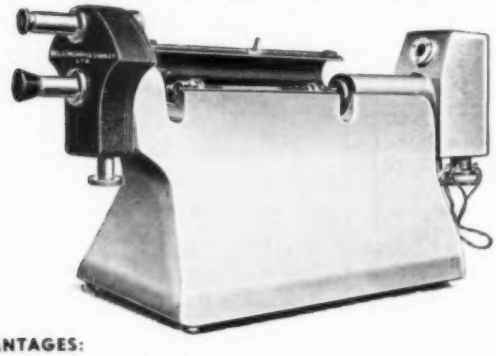

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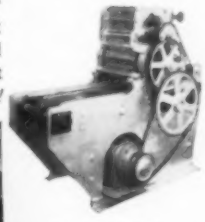

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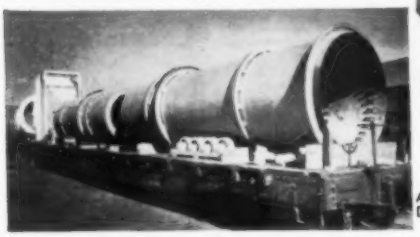

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GAL OYA DEVELOPMENT BOARD—CEYLON.

Vacancies in Sugar Industry.

Wanted for service in Ceylon in the Sugar Industry of the Gal Oya Development Board the following:—

1. **GENERAL MANAGER.** Should be a qualified Agricultural or Chemical or Mechanical Engineer over 45 years of age with sugar plantation and factory experience as Chief Engineer or Chief Chemist and at least 10 years experience as General Manager of a large sugar factory, and capable of managing a sugar project in all aspects and controlling plantations activities, and transport of cane and sugar. For terms and conditions see para 5 below.

2. **DEPUTY GENERAL MANAGER.** Should be a qualified Agricultural or Chemical or Mechanical Engineer over 40 years of age with sugar plantation and factory experience as Chief Engineer or Chief Chemist and at least 5 years' experience as General Manager of a large sugar factory, and capable of managing a sugar project in all aspects, controlling plantation activities, transport of cane and sugar and co-ordinating of harvesting and allotment of trucks.

   For terms and conditions see para 5 below.

3. **CHIEF ENGINEER.** Should be a qualified Mechanical Engineer over 40 years of age with knowledge of sugar technology, which is essential and extensive experience in sugar factories, workshop practice and maintenance of factories and at least 5 years experience as Chief Engineer in an electrified sugar factory, and capable of the efficient running of the factory.

   For terms and conditions see para 5 below.

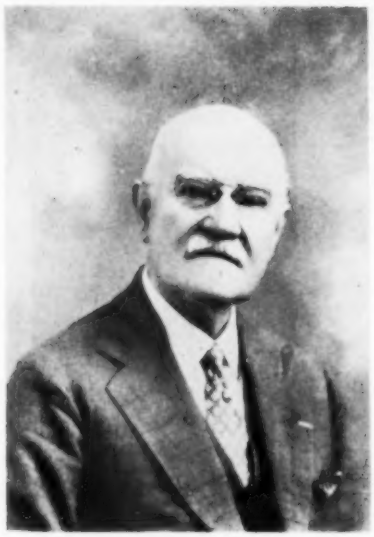
4. **CHIEF CHEMIST.** Should be a qualified Sugar Technologist over 40 years of age, with a good knowledge of engineering which is essential, and extensive experience as Chief Chemist in a white sugar factory and at least 5 years experience in a sulphitation sugar factory.

   For terms and conditions see para 5 below.

5. The above appointments will be on contract for a period of 3 years, renewable by mutual agreement. Free passages to and from the Island will be provided. Service will be in the Gal Oya Valley in the Eastern Province of Ceylon where rent free furnished quarters will also be provided. Ceylon Income Tax will be payable.

6. Applications giving full particulars including academic and professional qualifications, experience, age, present appointment and salary expected should be forwarded by air mail to the Secretary, Gal Oyal Development Board, P. O. Box 524, Buller's Road, Colombo 7, Ceylon to reach him by 1st April 1958.

7. Any further information required will be supplied on application.



J. Henry Lienau, 1871-1957

by Dan Gutleben

J. Henry Lienau, Nestor of American sugar refiners, died November 21, 1957, at the age of 86. At the time of his entry into sugar refining, the legendary masters, F. O. Matthiessen, H. E. Niese and George Bunker, from whom he acquired the fundamentals of good sugar refining, were in their prime.

According to the record he was born in 1871, graduated as a mechanical engineer from Stevens Institute in 1891, and spent his first five months out of college as a draftsman in the works of Robert Deeley, builder of sugar machinery. In the fall of 1891 he started his sugar career under Engineer John H. Webster at A.S.R. Company's Greenpoint refinery. It was at that time in charge of Oswald Rothmaler whom H. O. Havemeyer later transferred to the Western Refinery in San Francisco where he contributed to the education of refiner A. M. Duperu, subsequently of C. and H. In 1893, Lienau was transferred to the Matthiessen and Wiechers refinery in Jersey City. A short time thereafter, by recommendation of F. O. Matthiessen and J. V. V. Booraem, he was made assistant superintendent and started intensive training under the renowned Henry E. Niese.

By 1901 Lienau had had ten years of experience according to the calendar but, by the reckoning of the modern time clock, it was at least twenty. "Time was made for slaves." From this circumstance he derived his sugar house religion of "thereness," a characteristic which set him apart. Accordingly, in January, 1901, he was picked out by the newly formed National Sugar Refining Company to supervise operation of its New York refinery. It was a happy selection and so the management of this works became his permanent job. Whenever he had occasion to return from an out-of-town business trip his path homeward led by way of the refinery no matter how late the hour. It became peculiarly "Lienau's refinery" and the two developed together into outstanding American institutions.

Lienau pioneered in many modern devices. In 1922, he cooperated with Engineers Neuman and Andrews in the design and installation of the first fully automatic centrifugals with regenerative braking. These machines served the New York refinery affination station for more than thirty years. In the way of fuel conservation he directed the construction of a modern steam and power plant in the late 1930's. He and Neuman developed bulk storage and mechanical handling of raw sugar. He even made a start and some exciting progress on a mechanical sugar boiler In the refinery he demanded close chemical control and was wont to check operation with adventitious sampling. Oddly enough, he registered approval if he occasionally found a slight lack of clarity in the liquors. An operator who achieved 100% average as to clarity might habitually overdose with the deficant of phosphoric acid, a condition less easily remedied than an under-dose.

At the time National acquired the Warner refinery in 1927, General Manager Lienau placed Dr. John Schlegel in charge. It was a forbidding job. Deferred maintenance and modernization had made manufacturing costs a nightmare. Among other things there was a shortage of steam which the predecessor lessee-operator had planned to overcome by installing more boilers. Instead of adding more boilers and increasing fuel costs, steam conserving revisions were made that shut down one-third of the old boilers. They practiced dollar efficiency and developed the Vallez' filtration system, using paper pulp as filter aid. The same system was installed in the New York refinery, which is still profiting by its use.

After his retirement in 1943, Lienau maintained sharpness of wit through technical discussions with John Schlegel and other widely known sugar craftsmen with whom he attended scientific lectures on a variety of subjects. For recreation, he and his sugar house friends frequently gathered for lunch at the "Oyster Bar" in Grand Central Station—where the chronicler himself was privileged to be present. Among Lienau's greatest joys in recent years were his visits at the refinery with President Horace Havemeyer for discussion and advice in respect to refinery mechanics.

Extracurricularly, Lienau assembled a unique history of the M. & W. refinery, having the advantage of a large volume of records from his father, Detlef Lienau, who had served as architect for the plants of 1862 et seq. Furthermore, the background of his acquaintance with F. O. Matthiessen and the aggressive engineers and operators on his staff permitted him to write intimate history because he had lived it. His father's records supplied pictures of the refineries as well as of the personnel who wore silk hats and Prince Albert coats. Besides the formal history supplied by dates and figures, Lienau supplied biographies of important sugar craftsmen. During the sociable conventions at the "Oyster Bar" he told many interesting tales which reflected the conditions of the time.

■

Huntly Redpath Drummond

Huntly Redpath Drummond, director and vice president of Canada and Dominion Sugar Company and director of the Bank of Montreal died last December at the age of 93.

In 1910 he succeeded his father as president of the family business, The Canada Sugar Refining Co. Ltd. which later was merged with the Canada and Dominion Sugar Company. Mr. Drummond became a director of the Bank of Montreal in 1912 and Chairman of the Board in 1943. His other business interests included the Royal Trust Company of which he was honorary president, and a directorship in The Canada Bag Company.

An active sportsman all his life, Mr. Drummond particularly enjoying skiing and yachting. McGill University of which he was Governor for many years, in honoring him with a Doctor of Law degree, cited Mr. Drummond for "his long and distinguished career, his civic leadership, his public benefactions and his keen interest in the University."

■

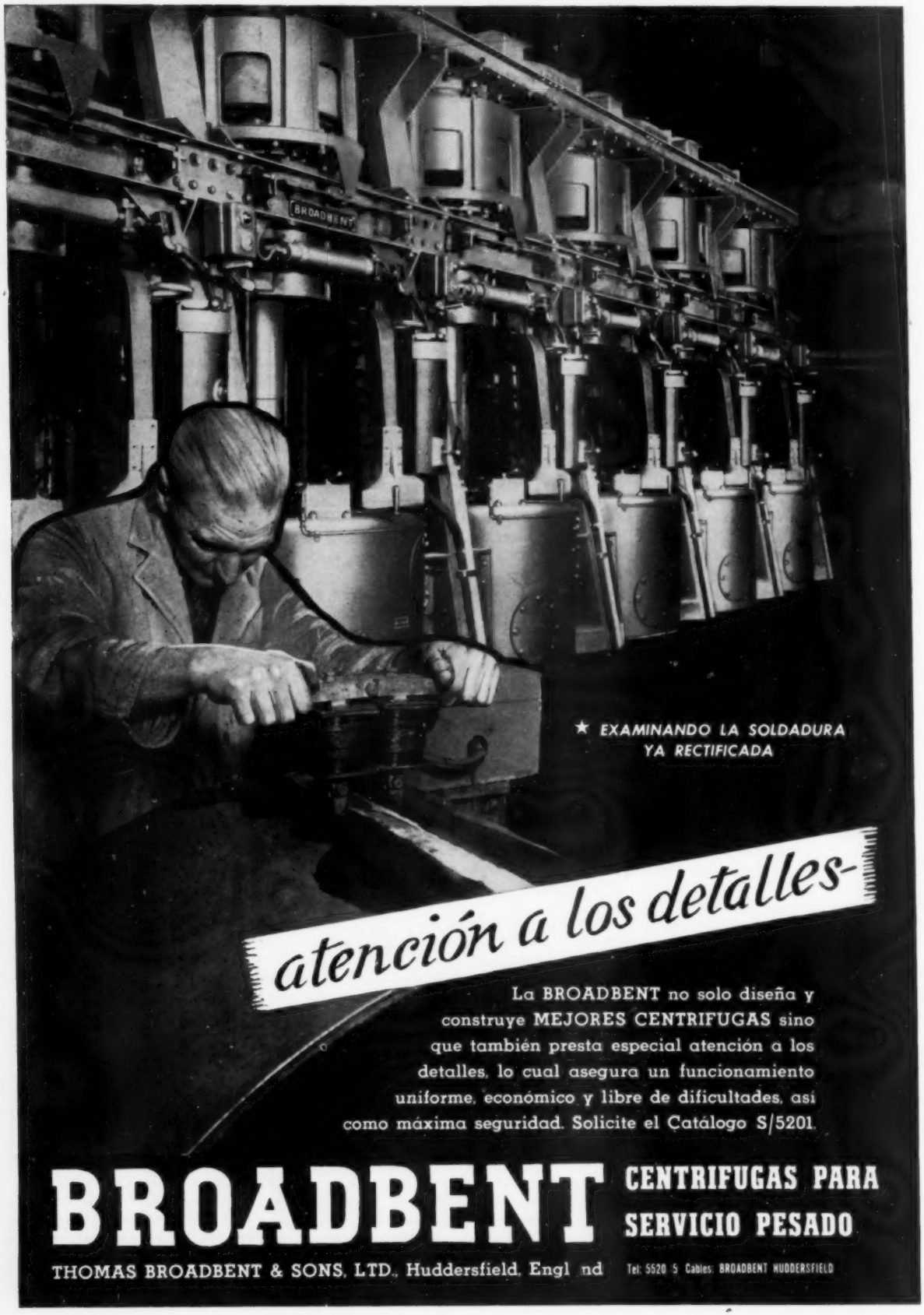
August Ludwig Dies

August Ludwig, 77, retired general manager of the former Menominee River Sugar Company and well-know resident of Menominee, Wisconsin, for the past fifty years, died last October.

Mr. Ludwig was born in Kristiansana, Norway. He graduated as a chemical engineer from Technical College in Oslo, Norway and studied every phase of the sugar industry for three years in institutes in Germany. In 1906, he came to the United States and worked for a year in the Philadelphia and Jersey City plants of the American Sugar Refining Company.

Engaged as a chemist in 1907 by the former Menominee River Sugar Company, he came to Menominee and remained with the company until his retirement as general manager in 1951.

Survivors include his wife, a brother, and several nieces and nephews.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AZÚCAR
Febrero 1958

Las Perspectivas Azucareras para 1958 Son Muy Inciertas

Por Alexander C. Muir, Gerente

Departamento de Investigación y Estadística
B. W. Dyer & Company

Las perspectivas para los precios mundiales del azúcar en el año 1958 están plagadas de incertidumbres, entre ellas la explosiva situación internacional, los desórdenes en Cuba y los informes contradictorios respecto a la producción soviética. Por lo tanto, parece probable que los precios serán inestables, aún cuando los límites de fluctación sean menores que en 1957.

A principios de 1957 los precios mundiales de azúcar alcanzaron, por primera vez desde la Guerra de Corea, niveles más altos que el precio de azúcar crudo en plaza en los Estados Unidos. Las estadísticas revelan que la firmeza relativa de los precios mundiales fué acentuada por las compras rusas, y el precio en plaza llegó a alcanzar 6.87 centavos por libra el 22 de abril. Una cosecha cubana más voluminosa de lo que se había esperado, más ofertas brasileñas, provocaron un descenso ulterior en los precios mundiales, y ya para el 5 de noviembre habían caído al punto más bajo del año, o sea a 3.50 centavos. Informes subsiguientes sobre la destrucción de la caña en Cuba, como resultado de las desavenencias políticas, provocaron un ligero aumento en los precios.

Las cuotas del Convencio Internacional del Azúcar han sido declarados en vigor para este año. No obstante, de rebasar el precio mundial el nivel de cuatro centavos, las cuotas quedarían sin efecto, como sucedió durante el período del 25 de enero al 19 de noviembre de 1957. Aunque, aparentemente, no habrá mucho azúcar disponible en exceso de las cuotas en la mayoría de los países durante la primera parte de 1958, cualquier aumento significativo en los precios probablemente tendría el efecto de estimular las ofertas. Por otra parte, el Convenio también contiene estipulaciones, según las cuales las cuotas serían restringidas de descender el precio por debajo de los 3.25 centavos durante un período especificado.

La producción mundial de azúcar durante el año agrícola de 1957/58 será probablemente de unas 47,700,000 toneladas cortas, valor crudo, según el Departamento de Agricultura de los Estados Unidos, comparado con unas 45,500,000 toneladas durante el período anterior, o sea un aumento de aproximadamente un 5%.

Se espera que la producción del Oeste de Europa será mayor que la de la cosecha pasada en 400,000 a 500,000 toneladas, pero se vaticinan cosechas menores de azúcar de remolacha en Italia, España y el Reino Unido. Se espera también que la producción del Este de Europa sea algo mayor, aunque el Departamento de Agricultura de los Estados Unidos ha calculado la producción rusa en sólo 4,800,000 toneladas cortas, comparado con el cálculo de F. O. Licht de unas 5,600,000 toneladas cortas. De ser correcta la primera cifra, la zona soviética prodría convertirse otra vez en importador neto, mientras, de ser correcto el cálculo de Licht, sería exportador neto.

El Instituto del Azúcar ha recomendado que Cuba limite su producción de 1958 a aproximadamente la misma cantidad producida en 1957, o sea unas 6,500,000 toneladas cortas, aún cuando Cuba podría producir más de 7,000,000 de toneladas cortas de no existir las restricciones oficiales. En todo caso, aparentemente existe una cantidad considerable de caña adicional que podría destruirse en la lucha política antes de que ejerciera una influencia significativa en la situación del mercado mundial.

Entre los países que esperan un aumento importante en la producción están el Brasil, el Perú, la República Dominicana, Suráfrica y la India. Las cosechas de remolacha y caña de los Estados Unidos, que se están elaborando actualmente, han alcanzado niveles sin precedentes. Por otra parte, se vaticina una cosecha menor para la Argentina, y es posible que los problemas políticos puedan afectar la producción indonesa de 1958.

El consumo mundial de azúcar ha registrado en años recientes un aumento promedio anual de aproximadamente un 5%. Aún cuando es posible que las dificultades de cambio extranjero en ciertos países pudieran reducir ligeramente la proporción de aumento en demanda en el año 1958, se espera que el consumo normal se aproximará al cálculo de producción del Departamento de Agricultura de los Estados Unidos.

El Consejo Internacional de Azúcar calcula las exigencias de azúcar del mercado libre en 1958 (que forman sólo una pequeña parte del consumo mundial total) en unas 6,080,000 toneladas cortas, valor crudo, comparado con un cálculo para 1957 de unas 6,880,000 toneladas cortas. La disminución en las exigencias calculadas para el año 1958 puede indudablemente atribuirse en gran parte al esperado aumento en la producción europea.

Las cuotas mundiales iniciales de exportación para el año 1958 fueron fijadas en unas 5,360,000 toneladas cortas, valor crudo, por los signatorios del Convenio Internacional del Azúcar. Además, es probable que otro millón de toneladas por lo menos estará también disponible para la exportación en países que no son miembros del Convenio.

A primera vista, parece que los suministros disponibles en el mercado libre estarán en exceso de la demanda calculada. No obstante, es dudoso que las cuotas de exportación de los países soviéticos, que suman unas 810,000 toneladas cortas, serán satisfechas.

Aunque la mayoría de las zonas productoras principales de ultramar tenían pocos excedentes disponibles para el mercado norteamericano a fines de 1957, Cuba sí tenía 600,000 toneladas cortas por lo menos. Así que, a menos que se intensifique la destrucción de la caña en Cuba, o que surjan compras inesperadas por temor a la guerra, esa cantidad debe ser suficiente para cubrir las necesidades de los Estados Unidos hasta que quede disponible la producción de la nueva cosecha.

El tiempo desfavorable contribuyó para crear en 1957 déficits en las cuotas de Puerto Rico, las Filipinas y Hawaii. Los actuales cálculos de producción indican que habrá déficits algunos en la cuota de 1958 en las Filipinas o Hawaii, o que éstos serán

pequeños, y cualquier déficit puertorriqueño será aparentemente bastante menor que en 1957.

La cuota inicial norteamericana para 1958 fué fijada en 8,800,000 toneladas, pero el aumento en los precios de azúcar mundiales y de Estados Unidos dió por resultado tres aumentos en la cuota, la que alcanzó el 3 de julio la cifra de 9,300,000 toneladas. Posteriormente, al descender los precios y quedar rezagadas las entregas estadounidenses en relación con el año anterior, se llevaron a cabo tres reducciones en la cuota, y la cuota final de 1957 quedó en 8,975,000 toneladas.

La distribución estadounidense de azúcar refino en el año 1957 ascendió aparentemente a menos de 8,600,000 toneladas cortas, aún cuando el consumo fué calculado en unas 8,800,000 toneladas. Por lo tanto, las existencias "invisibles" (aquellas acaparadas por consumidores industriales e institucionales de azúcar, cadenas de tiendas, mayoristas y consumidores domésticos), que fueron calculadas a principios de 1957 como muy por encima de lo normal, fueron reducidas considerablemente, aunque las entregas "constructivas" y "en tránsito" de azúcar de remolacha a fines de 1957 compensaron en algo esta reducción.

Las existencias visibles en los Estados Unidos (aquellas en manos de los distribuidores primarios), por otra parte, registraron probablemente un monto más alto en unas 400,000 toneladas que a principios del año. Las existencias de los elaboradores de azúcar de remolacha aumentaron en 50,000 a 100,000 toneladas, mientras los refinadores de azúcar de caña registraron un aumento de unas 300,000 toneladas. No obstante, sólo un 50% de las existencias de los refinadores de azúcar de caña se encuentran normalmente en la zona del noreste.

El consumo norteamericano para 1958 lo calcula el Departamento de Agricultura en unas 8,900,000 toneladas cortas, valor crudo. Sin embargo, la distribución de azúcar refino podría desviarse ligeramente de esa cifra, según la cantidad de existencias "invisibles" que se absorban y la magnitud del esperado decaimiento en los negocios en general. Debido a las ramificaciones de la Ley Azucarera, es probable que la demanda en el Noreste vuelva a causar mayor impacto sobre los suministros dentro de la cuota que la de otras regiones del país. Desde luego, las compras precipitadas, provocadas por una intensificación de la destrucción de la cosecha en Cuba o por ominosos sucesos internacionales, podrían fácilmente dar lugar a un aumento en la demanda por encima de los niveles normales.

El precio mundial del azúcar crudo se mantuvo durante la primera mitad del año 1957 por encima del precio correspondiente en plaza en los Estados Unidos. A pesar de repetidas seguridades cubanas, existían indudablemente ciertos temores de que azúcar de la cuota norteamericana fuese desviado hacia el mercado mundial. Por lo menos, colocó a los abastecedores extranjeros del mercado estadounidense en una posición muy ventajosa.

No se cree que se repitirá esta situación en 1958, a menos que se empeore la situación política internacional o la destrucción de la caña en Cuba se intensifique desde un punto de vista estadística. Sin embargo, el precio nacional en plaza probablemente no estará, en promedio, mucho por debajo del de 1957, aún cuando los abastecimientos totales dentro de la cuota estadounidense y las existencias parezcan mayores que la demanda normal calculada para todo el país. No obstante, esta anomalía podría dar por resultado otra vez debilidades en los precios en las zonas del país donde es más intensa la competencia.

Como los costos de los refinadores ofrecen pocas señales de un descenso, aparte de un posible aumento en el volumen de producción, parece razonable asumir que el margen de diferencia entre los precios de crudos y refinos en el Noreste durante el año 1958 se mantendrá más o menos en los mismos niveles que en 1957.

■

Pluviómetro Indicador en Pulgadas y en Milimitros

El grabado inserto muestra los componentes de un pluviómetro nuevo capaz de medir la precipitación en pulgadas o en milímetros. Las partes que se muestran en el grabado comprenden una estaca de tierra, de aluminio, de 18 pulgadas de largo; un poste de soporte, de 24 pulgadas de largo; una lata colectora, con deflector de evaporación, y disco protector de aluminio contra radiación de tierra. Se suministra una segunda lata colectora con tapa, y una vasija graduada para medid. Las latas colectoras se cambian en la estación pluviométrica, y se lleva el recipiente lleno al laboratorio, para medirlo. En vista de que se emplean ambas unidades de medida en las regiones azucareras, donde los pluviómetros son de creciente importancia, es interesante observar que el diseño del pluviómetro "Universal" se basa en el volumen de un litro métrico exacto de agua. A la profundidad de una pulgada exacta, el agua de la lata colectora mide en volumen 100 mililitros. Por consiguiente, la cantidad en mililitros del agua recogida en la lata es igual a la profundidad, en centésimos de pulgada, de la precipitación. Para obtener la profundidad expresada en milímetros se toma el volumen, en mililitros, y se divide por cuatro, o se utiliza una tabla de conversión. Este equipo lo fabrica la M. C. Stewart, bajo el nombre de Universal Rain Gauge.

■

Regulador de Temperatura Muy Exacto

Con un nuevo regulador dosificador, que suministra la Assembly Products, Inc., de Chesterland, Ohio, resulta posible mantener temperaturas dentro de límites tan pequeños como un grado Fahr.

El nuevo regulador utiliza la acción positiva producida por los contactos cerradores de un relevador medidor, pero nivela la temperatura mediante circuito interruptor de abrir y cerrar con relevador medidor. La precisión del nuevo regulador se debe a la utilización de la atracción electrostática a través de los contactos del relevador medidor. Se aprovecha esta atracción tanto para dosificar el tiempo que el calor está abierto como para producir el cierre anticipado o prematuro de los contactos antes de que llegue el marcador al punto límite. Esta anticipación impide que el efecto cumulativo del aumento de calor eleve la temperatura más allá del límite.

Aunque se diseñó originalmente para la regulación exacta de temperaturas donde quiera desde—200 hasta 3000 grados Fahr., el nuevo circuito puede también utilizarse para regular numerosas otras variables con precisión comparable. En general, cualquier clase de función que pueda medirse en corriente o en voltaje, cabe muy bien regularla dentro de los límites de los relevadores medidores de la Assembly Products—desde unos 10 microamperios hasta 50 amperios.

Dextrana y Gomas Asiáticas

Sacarosa Sobrante en la Perforación de Pozos de Petróleo

Por Wm. L. Owen

Wm. L. Owen Laboratories
Baton Rouge, La., E.U.A.

En el siglo pasado ocurrieron varias transiciones en la clase de productos derivados de sacarosa y miel final para fines industriales. En un tiempo, la miel final se utilizaba principalmente para la producción de alcohol industrial; hoy día, la producción de alcohol etílico en este país derivada de mieles finales no pase de un tercio de la producción anterior de 300,000,000 de galones. Después del decaimiento de la industria de alcohol etílico, que ofrecía un medio de salida para la miel final, surgió otra gran industria basada principalmente en miel final como materia prima; nos referimos a la industria de la acetona y el butano, que alcanzó su apogeo en la tercera dácada del siglo actual. Luego se desarrolló el proceso para la producción de ácido cítrico, en el que se utiliza más azúcar que miel final. Hoy día, la principal demanda de miel final parece provenir de elaboradores de pienso para ganado, que fué uno de los primeros fines a que se dedicó la miel final. Desde luego, existen otras industrias que consumen fuertes cantidades de miel final, como la de levadura y la de ácido acético, así como la de ácido láctico en menor escala. Según los últimos informes de ventas del Departamente de Agricultura de Estados Unidos, la industria de piensos animales ha reemplazado y superado la industria del alcohol como la mayor consumidora de mieles finales de caña.

La causa del ascenso y decaimiento de estas diversas industrias ha sido el continuo avance del proceso de síntesis química, como lo demuestra la absorción casi total de la industria de alcohol etílico y butílico por la de alcoholes sintéticos, llegando al punto que las ventas de etanol sintético superan en alto grado las de alcoholes de fermentación.

Por otra parte, el proceso sintético ofrece una de las posibilidades más prometedoras para el empleo de sacarosa, la que puede llegar a librar a la industria azucarera del gravoso problema de la sobreproducción y sobrantes; se trata de la producción de ésteres de sacarosa y de detergentes derivados de los primeros.

Es, no obstante, en la producción de gomas de azúcar donde se puede anticipar la mayor absorción de sacarosa sobrante, pues las industrias que la emplean consumen fuertes cantidades. Tomemos la dextrana, por ejemplo: en un tiempo, la industria azucarera la consideraba como una plaga, por su viscosidad y resistencia a la clarificación y filtración de los licores de azúcar que la contenían; hoy día, la dextrana tiene gran demanda en la perforación de pozos petrolíferos precisamente por sus cualidades o defectos que tanto agobiaban a los productores de azúcar, especialmente en Louisiana. Hacía años que la industria petrolera venía buscando un retardante efectivo contra la pérdida de agua en flúidos o lodos de perforación, para lo cual la dextrana resultó ser ideal. En el Central España, Cuba, se encuentra en operación una planta experimental por los proceso Owen,* la que viene produciendo dos toneladas de dextrana diarias. A la fecha se han importado más de 100,000 libras de dextrana para trabajos de perforación de pozos de petróleo. La planta experimental en Cuba probablemente está consumiendo no menos de cinco toneladas de azúcar diarias, y si la demanda de la industria petrolera ha de ser satisfecha, la producción de dextrana tendrá que ser elevada a 25-50,000 toneladas. Y esto es para una sola industria. Las gomas de fermentación, la mayoría de las cuales se pueden emplear en lugar de las gomas vegetales importadas de países asiáticos, y usadas en la preparación de cosméticos, alimentos, adhesivos y textiles, pueden encontrar un mercado casi inagotable en este país. En un artículo previo publicado en esta revista, el autor ha dado varios datos acerca de las aplicaciones y consumo de estas gomas vegetales, pero cree conveniente reproducirlos en el presente trabajo.

Por la tabla anterior se observará que hace diez años se consumían aproximadamente 18,000 toneladas de estas gomas, cuyo monto probablemente sea ahora mayor. El consumo de gomas derivadas de sacarosa probablemente supere la cifra anterior, pues si éstas llegan a substituir solamente la mitad del almidón que se está usando actualmente en la preparación de lodos de perforación, calculado en 100,000,000 libras

Perforación de un Pozo de Petróleo. El empleo de dextrana en estas operaciones puede llegar a abrir un importante mercado para este subproducto de sacarosa. En este artículo se describen varios productos derivados de sacarosa propios para substituir otras gomas exóticas.

*U.S. Patent 2,392,258, Wm. Ludwell Owen and Wm. L. Owen, Jr., Jan. 1, 1946. U.S. Patent 2,360,327, Horance Bailey and Wm. L. Owen, Oct. 17, 1944.

TABLA I.*

Goma	Origen	Mercado Potencial	Precio de Venta	Aplicaciones
Algina	Algas	Se venden 8,000 toneladas anuales en EUA.	De 80¢ a $1.00 la libra.	Como agente emulsivo, de suspensión, gelatinígeno, de espesamiento, y de apresto (especialmente como estabilizador para helados o mantecados); en productos alimenticios de naturaleza espumosa, gelatinosa o emulsiva; en capas de azúcar para tortas, chocolate y leche batida, crema batida; emolientes para las manos; para agua de alimentación de calderas para impedir la incrustación; para apresto de materiales; para productos farmacéuticos.
Arábiga	Acacia	Se venden 7,000 toneladas anuales en EUA, y 30,000 toneladas en todo el mundo.	De 11 a 12¢ la libra en forma cruda y 14 a 15¢ en polvo.	Para adhesivos, pulimentos, confites, impresión de telas, apresto para papel, tintas, pinturas y productos farmacéuticos.
Karaya	Sterculia	Se importaron 1,300 toneladas en 1948.	36 centavos la libra.	Textiles, cosméticos, alimentos y otras industrias.
Semilla Curbaril	Curbaril	Se importaron 1,200 toneladas en 1948.	De 29 a 31¢ la libra, en polvo.	Industrias papelera y de textiles.
Tragacanto	Astragalus			Con goma arábiga, come agente emulsivo; para textiles, cosméticos, productos farmacéuticos, y recubrimientos.

* Los datos para esta tabla fueron proporcionados por la Iniis, Speiden & Co., de Nueva York, y el Dr. C. L. Mantell en su excelente libro sobre "Water Soluble Gums" (Gomas Solubles en Agua).

anuales, se necesitarían 25,000 toneladas o más que todas las gomas que se están usando ahora para todos los fines.

La producción de dextrana como acrecentante de plasma sanguíneo y aditivo coloidal para lodos de perforación tiene un futuro prometedor que indudablemente la elevará a una importante industria mundial, y su valor recientemente establecido en la industria petrolera debiera asegurar más que nunca su futura prominencia en aplicaciones industriales.

Más, el éxito de la dextrana probablemente sea solamente el principio, pues existen otras gomas prometedoras que se pueden obtener de la sacarosa, como la levana, la levulana, la celulana, etc. Aunque ninguna de estas gomas ha sido producida industrialmente hasta ahora, la levana posee cualidades que pueden hacerla propia para complemento de gomas de alta viscosidad como la dextrana. En calidad de adhesivo, fácilmente puede llegar a reemplazar la goma arábiga en productos farmacéuticos, y como esta última es importada del Sudán, una fuente de suministro nacional sería de gran beneficio para el país norteamericano. Como la formación de goma arábiga obtenida de la acacia es el resultado de una infección patológica de este arbusto y requiere cierta condición para su formación, el rendimiento anual es variable y el suministro no es seguro.

Además de las gomas de fermentación obtenidas de la sacarosa, hay otras que se pueden extraer de mieles finales y hasta de la torta de filtro, las que al tratarlas químicamente con aldehidos pueden servir para substituir algunas gomas crudas actualmente usadas en la perforación de pozos petrolíferos y otras industrias.

Publicaciones

1. The Production of Gum Dextran. Wm. L. Owen, *Sugar*, Agosto, 1948.
2. Dextran as a Profitable By-Product of the Cane Sugar Industry. Wm. L. Owen, *Sugar*, Marzo, 1950.
3. Dextrana as a Sugar Industry By-Product. Its Versatility and Industrial Use. Wm. L. Owen, *Sugar*, Feb., 1951.
4. Dextran as a Preventive in Water Loss in Oil Well Drilling Muds. Wm. L. Owen, *Sugar*, 1951.
5. Production of Industrial Dextran Seen as Promising Outlet for Surplus Sucrose. Wm. L. Owen, *Sugar*, Mayo, 1955.

■

Despachadores de Pedidos de Equipo Azucarero

La industria extranjera y los importadores de equipos norteamericanos tienen a su disposición un nuevo servicio que comenzó a prestarse recientemente bajo el nombre de RG Expediters Service, con sus oficinas principales en el número 220 de la Quinta Avenida, Nueva York 1, N.Y. Esta empresa tiene por objeto ayudar a las compañías y los individuos localizados en el extranjero para que puedan obtener materiales o servicios en los Estados Unidos. Esta compañía les ayudará a localizar fuentes de abastecimiento de quipos, a obtener cotizaciones muestras y catálogos. Gestionará también la rápida entrega en caso de pedidos ya colocados o obtendrá informes sobre el estado exacto de equipos ya pedidos. El Administrador es Robert F. Gueydan, quien ha tenido gran experiencia en el comercio de exportación como vicepresidente y administrador de Alberto Ubbelhode, Inc. Ha actuado también como Subdirector de Compras de la Remington Rand Division, Sperry Rand Corporaiton, y Agente de Compras en el Este de los Estados Unidos para la Convair, fabricantes de aviones y proyectiles dirigidos.

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Calculador de Superficie Filtrante

La División de Filtros Niagara de la American Machine & Metals, Inc., ofrece gratis una máquina calculadora de tamaño para el bolsillo, que facilita la rápida determinación de la superficie filtrante que se requiere para la filtración eficiente. El aparato está construído por el principio de la regla de cálculo. La superficie filtrante puede determinarse en términos de rápidez de filtración, en un lado, y en términos de capacidad de torta, en el otro. La mayor de las dos superficies así obtenidas representa los pies cuadrados de superficie filtrante que se debe usar.

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Aumentan los Ingresos de la Cuban-American

El informe anual de la Cuban-American Sugar Company para el año que terminó el 30 de septiembre de 1957 revela ingresos netos de $3,013,912, comparado con ingresos netos de $2,719,401 el año anterior. Los dividendos aumentaron en 50 centavos por acción y ascendieron a $1.75 por cada acción común; los dividendos sobre acciones preferidas fueron de $7.00 por acción. Se informaron distintas mejoras para la Colonial Sugars Company en la refinería Gramercy, incluyendo un turbogenerador y una caldera. En Cuba continuó la substitución de locomotoras Diesel por las locomotoras de vapor y nuevos tachos al vacío y evaporadores han sido instalados en Chaparra y Delicias. Es de gran significado la formación de una división sucroquímica de la Colonial para elaborar productos químicos a base de la caña de azúcar como la materia prima principal. Cuban-American ha tenido hace mucho tiempo un activo interés en Sugar Association, Inc., participa en The Sugar Cane Wax Enterprises, de la cual es copropietaria con S. C. Johnson & Son, Inc. y es miembro del Comité para el Mejoramiento de la Caño.

Nueva de Enfermedad de la Caña de Azúcar

La Mancha Bacteriana en Queensland

Por D. R. L. Steindl
Bureau of Sugar Experiment Stations, Brisbane, Australia

Durante los últimos diez años funcionarios de la Colonial Sugar Refining Company vienen anunciando la presencia esporádica de una enfermedad aparentemente nueva de la caña de azúcar en regiones inadecuadamente avenadas al norte de Queensland (Australia). Los patólogos de la Colonial le habían dado a esta enfermed el nombre de "enfermedad de las raíces", debido al escaso desarrollo de las raíces de las plantas afectadas. Durante los últimos dos años funcionarios del Negociado de Estaciones Experimentales de la Caña de Azúcar encontraron esta enfermedad en varias otras regiones.

La presencia de esta enfermedad en estas regiones sugiere que la misma podría convertirse en un importante problema económico y fué por esta razón que se inició un estudio de su causa y medio de transmisión.

Los primeros síntomas de la enfermedad se manifiestan por rayas de color blanquecino y forma regular de uno a dos milímetros de ancho que se extienden desde la base o cerca de la base de las hojas hacia arriba y paralelamente con el haz vascular. Cada hoja puede tener una o muchas rayas, las que a veces se extienden a todo el largo de la hoja, pero que más a menudo terminan a intervalos irregulares. Subsiguientemente se observan áreas de color naranja o rojizo, y por último gran parte de las rayas se confunden unas con otras. Es entonces que la enfermedad se asemeja mucho a la enfermedad de *mildeu velloso* en estados avanzados. A medida que progresa la enfermedad, la infección se sistematiza, el desarrollo de los brotes afectados se retarda, y las hojas tiernas se cubren de manchas cloróticas—frecuentemente sin distinguirse las rayas. Con el tiempo, estas hojas muestran numerosas rayuelas de color rojizo y rayas cortas y estrechas; más tarde, las puntas y márgenes de las hojas se marchitan, las hojas se encaracolan hacia adentro, y al fin muere todo el brote. Frecuentemente, los tallos enfermos producen numerosos brotes laterales, los que también muestran manchas características y sus hojas presentan un color rojizo.

En los tallos de plantas severamente afectados se presentan pequeñas áreas necróticas de color pardo, especialmente cerca de los entrenudos y de la yema terminal. A veces se parten y forman pequeñas cavidades que a menudo contienen gotitas de una substancia gomosa.

Se pueden enfermar macollas enteras, pero a veces sólo es afectada parte de la macolla, la que al fin muere, dejando el resto de la macolla aparentemente sana. Si se transplanta una macolla enferma o trozos de tallos enfermos, sólo producirán pequeños brotes enfermizos que morirán al cabo de pocas semanas de crecimiento.

Los análisis microscópicos de hojas y tallos enfermos revelaron gran cantidad de bacteria en los tejidos, la que fué fácilmente aislada en culturas puras de gran número de ejemplares enfermos. Esta bacteria todavía no ha sido identificada, pero se sabe que es un organismo multiflagelado en forma de bastoncito que posee varias de las características de la *Exuinia*. Estas culturas fueron enviadas al Commonwealth Mycological Institute (Instituto Micológico del Estado) para su identificación.

La patogenicidad de esta bacteria ha sido demostrada por la inoculación de posturas y renuevos de las variadades de caña Q. 57 y Trojan (troyana). En el caso de la variedad Q. 57, germinaron 46 plantas, pero al llegar a una altura de tres a cuatro pulgadas, 17 de ellas se pusieron amarillas, se marchitaron y murieron. De las plantas restantes, subsiguientemente cinco de ellas desarrollaron las rayas típicas en las hojas y las manchas características de la enfermedad. En el caso de la variedad Trojan o troyana, germinaron todas las plantas, de las cuales dos murieron temprano (como con la variedad Q. 57), y más tarde otras tres desarrollaron los síntomas característicos. En ambas variedades, la bacteria fué fácilmente reaislada de las plantas infectadas. De las posturas trasplantadas al mismo tiempo, todas se desarrollaron normalmente.

En el segundo experimento se inocularon 24 renuevos con una suspensión de bacteria. Al cabo de unos diez días todas las plantas mostraban un área necrótica rojiza alrededor de los puntos de inoculación en las hojas tiernas, con una mancha clorótica partiendo de esos puntos. La variedad Q. 57 fué más severamente afectada que la Trojan. Al cabo de tres semanas después de la inoculación comenzaron a desarrollarse rayas típicas de la enfermedad en todas las plantas, y una vez más la bacteria fué aislada fácilmente. Más tarde, muchas de las

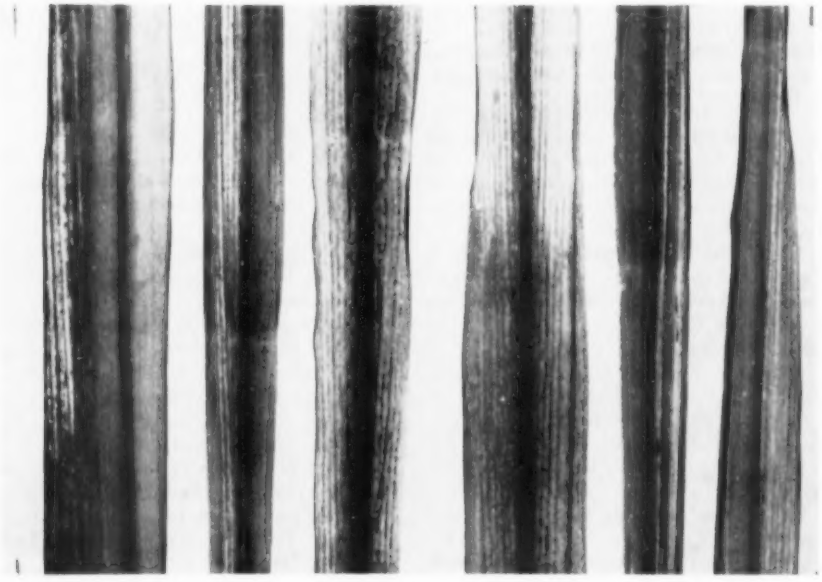

Fig. 1. Hojas de caña Trojan afectadas por la "mancha bacteriana", una enfermedad nueva de la caña de azúcar. La hoja al extremo izquierdo está afectada sólo parcialmente.

Fig. 2. Macolla de caña Trojan el la región del río Herbert, Norte de Queensland, afectada por la mancha bacteriana.

modo son infectados y producen renuevos plantas comenzaron a brotar hojas sanas y parecían que estaban recuperando de la enfermedad. Sin embargo, entonces comenzaron a brotar muchos renuevos laterales en la base de los tallos, los que acusaban síntomas característicos de la enfermedad. Parece que la bacteria baja por las vainas de las hojas a los brotes tiernos, de cuyo laterales sistemáticamente enfermos. Tres meses después de ser inoculadas, las plantas de la variedad Q. 57 sólo acusaban cuatro brotes primarios enfermos, pero 22 de las 24 plantas acusaron renuevos laterales enfermos. En la variedad Trojan no se observaron brotes primarios enfermos, pero 10 de las 20 plantas inoculadas estaban brotando renuevos laterales enfermos. Una vez más, las plantas de ambas variedades no inoculadas crecieron normalmente.

La transmisión de la enfermedad en el cañaveral no suele ser muy rápida, pero es muy destructiva en el caso de plantas enfermas. La enfermedad suele ocurrir en regiones bajas, y su propagación parece estar asociada con la anegación del terreno; suele aparecer en campos de caña de retoño que fueron anegados como las siembras de caña de planta. Es muy probable que la bacteria es arrastrada por el agua de riego, de modo que si llega a alojarse en el vástago de los renuevos, en los brotes al pie de las macollas, o en una lesión del tallo de la planta, puede producir la enfermedad.

Las variedades Q. 57 y Trojan parecen ser las más susceptibles entre las variedades sembradas en las regiones donde ocurre la enfermedad, pero también se ha encontrado en las variedades Badila, Oosmus, Eros y Q. 45.

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Corrección: "Puerto Rico Aumenta el Uso de Abono en 1000%"

En la página 33 de la edición de enero de 1958 de *Sugar y Azúcar* se publicó un artículo titulado "Puerto Rico Aumenta el Uso de Abonos en 1000%," acreditado a nuestro corresponsal, Arturo Riollano. Debido a un lamentable descuido, no se tuvo en cuenta la petición del Sr. Riollano de que mencionáramos como autores al Dr. George Samuels, agrónomo, y al Dr. B. G. Capó, Director Asociado de Investigaciones de la Universidad de Puerto Rico. El material para el artículo se tomó del Trabajo Técnico Número 16 (Investigaciones Llevadas a Cabo en Puerto Rico con Abonos para Caña de Azúcar, 1910-54), publicado en marzo de 1956.

■

Fallecimiento del Sr. Albin J. Stevens

Albin J. Stevens, Superintendente General retirado del Central Buena Vista, en Argentina, falleció el pasado mes de diciembre en su residencia en Baton Rouge, La. Graduado de la Universidad del Estado de Louisiana, el Sr. Stevens prestó servicios como Superintendente Auxiliar en el Central Hershey, en Cuba, de 1920 a 1926. Hasta 1932, fué Superintendente de los Centrales Baguanos y Tacajó, pertenecientes a la Antilla Sugar Company. En ese año llegó a ser el Superintendente General del Central Buena Vista, donde permaneció hasta 1952, cuando se retiró por enfermedad.

Durante su estancia en Argentina, el Sr. Stevens organizó también la empresa de ingenieros de Stevens y Villasuso, que aún funciona.

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Nombramientos al Comité Internacional de Tecnólogos de la Caña

Se han anunciado los nombramientos para el Comité de Programa y Publicaciones del Congreso Décimo de la Sociedad Internacional de Tecnólogos de la Caña de Azúcar, que se reunirá en Honolulu, Hawaii, del 3 al 23 de mayo de 1959.

El Sr. Dr. L. D. Beaver, Director de la Estación Experimental de la Hawaiian Sugar Planters' Association, Presidente General del Congreso, ha nombrado a los siguientes miembros:

El Sr. Dr. Roger P. Humbert, Agrónomo Principal, Estación Experimental de la HSPA, será presidente del Comité de Programa y Publicaciones (Dirección: Experiment Station, HSPA, Honolulu, Hawaii).

El Sr. Dr. John H. Payne, Tecnólogo Principal del Azúcar, Estación Experimental de la HSPA, será presidente de la Sección de Fabricación. (Dirección: Experiment Station, HSPA, Honolulu, Hawaii).

El Sr. J. P. N. Bentley, Gerente de Fábrica, de la Tongaat Sugar Co., Sudáfrica, será presidente de la Subsección de Molienda. (Dirección: Tongaat Sugar Co., Maidstone, Natal, P. O. Box 5, Africa del Sur.)

El Sr. C. N. Davis, Químico Principal, Colonial Sugar Refining Co., Australia, será presidente de la Subsección de Elaboración. (Dirección: 1 O'Connell St., Sydney, N. S. W., Australia.)

El Sr. R. J. Innes, Director de Investigación, Jamaica Sugar Manufacturers Assn., será presidente de la Sección de Agricultura. (Dirección: Mandeville P. O., Jamaica, Antillas Británicas.)

El Sr. Dr. H. M. Tysdal, del Departamento de Agricultura de los Estados Unidos, será presidente de la Sección de Propagación de Caña. (Dirección: U. S. Dept. of Agriculture, Tobacco & Sugar Crops Section, Beltsville, Maryland, EE. UU. A.)

El Sr. C. G. Hughes, Patólogo, Brisbane, Australia, será presidente de la Sección de Patología. (Dirección: Bureau of Sugar Experiment Stations, William St., Brisbane, Queensland, Australia.)

El Sr. Ralph Mathes, Entomólogo, U. S. Dept. of Agriculture, Experiment Station, Houma, Louisiana, será presidente de la Sección de Entomología.

Los estudios e informes relativos a estas secciones se presentarán durante la semana del 18 al 22 de mayo, 1959.

El Dr. Baver solicita que se envíen dos ejemplares de todos los trabajos. Los resúmenes deberán recibirse para el primero de julio, 1958, y los manuscritos para el primero de noviembre, 1958.

Además del Dr. Baver, los funcionarios del Congreso Décimo serán:

El Sr. Dr. S. J. P. Chilton, Jefe del Depto. de Patología Vegetal, Louisiana State University, Baton Rouge, La., quien será vicepresidente general.

El Sr. W. W. G. Moir, American Factors, Ltd., Honolulu, Hawaii, será secretario-tesorero.

Los presidentes de comités generales:

Sr. Dr. John N. Warner, Senior Geneticist, Estación Experimental, HSPA, quien encabezará el Comité General de Organización.

Sr. Dr. Humbert, de la Estación Experimental de la HSPA, quien será presidente de Programa.

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Extractos de Publicaciones Azucareras

Publicados bajos los Auspicios de la Sociedad Internacional de Tecnólogos Azucareros de Caña por Arreglo Especial con SUGAR y AZUCAR—Dr. O. W. Willcox, Redactor Técnico

Agronomía

Electro-Espolvorización de Cosechas

N. G. SHREEVE, *World Crops*, Vol. 5, No. 9, págs. 205-206 (1957).

La firma Agricola Plant Chemicals, Ltd. ha concebido un aparato con el cual las partículas de insecticidas y fungicidas en polvo pueden ser imanadas con cargas positivas de electricidad estática. Al venir en contacto con las plantas, las partículas así cargadas generan una carga eléctrica negativa y se adhieren a la superficie de las hojas a pesar del viento y otras condiciones adversas, y su acción protectora es mucho más efectiva que la de partículas no cargadas. Esto permite obtener importantes economías en la cantidad de polvo a emplear; además de la capa de polvo más completa y uniforme en ambas caras de las hojas, el polvo se aguanta más tiempo y el período de protección es más prolongado.

■

Fungicidas para la Represión de la Pudrición Roja en la Caña

S. L. SHARMA y asociados, *Indian Journal of Sugar Cane Research*, Vol. 1, Parte 3, págs. 174-175 (1957).

Informan que se han usado fungicidas con buenos resultados contra varias especies de *Colletotrichum*, que causan la enfermedad de la pudrición roja. Durante trabajos experimentales realizados por la Indian Central Research Station se sometieron a prueba tres fungicidas comerciales—Blitox, Perenox y Spersul—en caña de la variedad Co. 453 obtenida de semilla que se sabía estaba enferma. Los fungicidas se usaron en soluciones al 1% a razón de 200 galones por acre. Las aspersiones se iniciaron cuando las cañas nuevas mostraron lesiones de pudrición roja en las hojas y tallos y fueron continuadas en cinco intervalos entre julio de 1955 y febrero de 1956.

De los datos recogidos, parece que de los tres fungicidas citados, el Spersul es el mejor para este fin; Perenox es casi tan bueno. Estos dos fungicidas lograron contener la enfermedad el 25.9% y 23.5%, respectivamente, comparado con siembras de testigo.

■

Plantas Hospederas del Virus del Raquitismo de la Caña de Azúcar

R. J. STEIB y I. L. FORKER, *Sugar Bulletin*, Vol. 35, No. 23, págs. 375, 379 (1957).

En una serie de experimentos realizados en un invernadero se encontró que la hiebra 'Johnson' o zahina *(Sorghum halepense)* y las plantas de maíz que habían sido inoculadas con el virus del raquitismo de la caña no acusaron síntomas externos de esta enfermedad, pero cuando el jugo de estas plantas fué inoculado en plantas de caña, aparecieron los síntomas característicos del raquitismo.

Este dato es importante, pues hay amplia evidencia de que el virus puede ser transmitido a la caña de azúcar por implementos agrícolas que vienen en contacto con los rizomas de la hierba 'Johnson'. Por lo tanto, se recomienda que se siembre semilla tratada y la progenie de esta semilla, para el establecimiento de invernaderos libres de la enfermedad, en tierras exentas de hierba 'Johnson'.

■

Pérdida de Azúcar en la Cochura de Mieles de Bajo Grado

H. M. THOMPSON y asociados, *International Sugar Journal*, Vol. 59, No. 704, págs. 213-216 (1957).

Partiendo del supuesto que cuanto más baja es la pureza de las mieles en proceso de elaboración mayor será la pérdida de azúcar, en la refinería de Tate and Lyle se llevó a cabo una serie de ensayos con templas de mieles de afinación de azúcares de primera y segunda. Los resultados demuestran que la destrucción de azúcar aumenta con la baja de pureza de las mieles en el proceso de elaboración. Los datos demuestran una pérdida promedia de azúcar total de 0.17, 0.26 y 1.01% en las templas de mieles de afinación de primera y segunda, respectivamente.

La cantidad de sacarosa descompuesta o destruída en el proceso de cocción oscila entre 1.1 y 1.5% y difiere muy poco en los tres materiales. Por consiguiente, según baja la pureza de las mieles enviadas a los tachos, se observa un aumento en la producción de azúcar invertido que más tarde se descompone. Los análisis cromatográficos de estos azúcares indican muy poca tendencia hacia la destrucción preferencial de levulosa. También indica que los productos de descomposición no poseen la propiedad de la solución reductora de Fehling. La pérdida de sólidos totales en los ensayos con templas de mieles de primera y segunda fué aproximadamente una cuarta parte de la pérdida de azúcar. En la cochura de mieles de afinación se observó poco cambio en los valores de color y pH.

■

El "Moteado Bacteriano"; Nueva Enfermedad de la Caña

D. R. L. STEINDEL, *Cane Growers' Quarterly Bulletin*, Vol. 21, No. 1, págs. 6-8 (1957).

Se ha descubierto una nueva enfermedad de la caña que ocurre en las tierras bajas y aparece frecuentemente en las cosechas de retoño que proceden de caña de semilla inundada. Los primeros síntomas consisten en listas regulares, de color blanco pastoso, que tienen uno o dos milímetros de ancho y se extienden desde, o cerca de la base de la hoja, paralelas con los haces vasculares. Más tarde se forman zonas de color naranja o rojizas. En esta etapa, los síntomas se parecen a los de 'mildeu velloso' *(Peronosporaceae)* en estado avanzado. Al fin, las hojas se marchitan y encaracolan hacia adentro y el retoño se muere. Las plantas enfermas producen numerosos retoños laterales en la base. Un examen microscópico de las zonas infectadas revela la presencia

de una numerosísima colonia de bacterias en forma de varilla, que tienen muchos flagelos y se parecen al grupo *erwiniano*. La enfermedad causa grandes estragos en las plantas infestadas. Las variedades Q.57 y Trojan parecen ser las más susceptibles, pero también se ha observado en las variedades Badila, Comus, Eros y Q.45.

■

Tecnología

Descarte de Despojos de Destilación de Mieles Finales

G. GUNDU RAO, *Indian Sugar*, Vol. 7, No. 4, págs. 265-269 (1957).

En la refinería de Daurala, los despojos de destilación se diluyen a 12 veces su volumen con condensado de destilería, o con agua de desecho, o con agua de pozo, y se llevan por una zanja revestida a terrenos adyacentes. La extensión de tierra necesaria para absorber los despojos de destilación de 50,000 galones diarios es de 150 a 200 acres. Los resultados han sido extraordinarios. Hay una constante demanda de parte de los agricultores por esta agua, y hasta están dispuestos a pagar por ella. Se observó que una fuerte aplicación de despojos de destilación diluídos, seguida de tres o cuatro aplicaciones ligeras, elimina la necesidad de abono para un buen rendimiento de caña de azúcar. En efecto, si se usan cantidades exageradas, las plantas de caña tienden a acamarse.

También se ha pensado en adoptar la práctica de fábricas de pulpa de sulfito que fermentan sus licores de desecho para la producción de levadura o alcohol y concentran los despojos a 55 por ciento sólidos en un evaporador de múltiple efecto, del cual el condensado primario sirve como agua de alimentación. El licor concentrado se quema en el hogar de la caldera por un tipo especial de quemador oscilante.

■

Elaboración de Mieles Finales por el Proceso Reich

GUSTAVE T. REICH, *Sugar Journal*, Vol. 26, No. 4, págs. 38-39 (1957).

Tres destilerías en Cuba están elaborando 150,000 galones de miel final por el proceso Reich para la producción de alcohol absoluto y extrayendo unas 30,000 libras diarias de levadura seca. Para poder obtener una levadura de buena calidad, la miel se destila con agua hasta obtener una concentración propia para la cristalización de sulfato de calcio hidratado bajo condiciones reguladas de tiempo, temperatura y pH. Los principales elementos químicos empleados en este tratamiento son sulfato de amonio y ácido sulfúrico; la finalidad es obtener un sulfato de calcio que tenga una estructura monoclínica. Por este tratamiento se puede precipitar y remover el 80 por ciento de la cal (CaO) en centrífugas de canasto para sólidos, mientras que un sistema de operación mal equilibrado sólo lograría remover el 20 por ciento de la cal. La miel así elaborada se destila con agua y se fermenta con levadura pura. El mosto fermentado pasa por separadores, y el licor se desalcoholiza en el alambique; la levadura así obtenida se lava, se seca y se envasa en bolsas de papel. Ahora, la levadura contiene más de 40 por ciento de proteína, de 7 a 9 por ciento de ceniza, e importantes proporciones de vitaminas como tiamina, riboflavina, ácido pantoténico, niacina, biotina, clolina, y un alto porcentaje de aminoácidos.

La levadura producida en estas destilerías se vende en Cuba y en el exterior como pienso para ganado y aves de corral, y se puede convertir en alimento humano que debiera ser de interés especial para regiones donde prevalece la mala nutrición por la escasez de alimentos ricos en proteína.

Como la levadura se hace necesaria para la producción de alcohol, no implica costo adicional puesto que éste se carga al costo de la miel final utilizada. No obstante, una cantidad adicional de miel final aumentaría la producción de levadura sin aumento en la producción de alcohol.

■

Tratamiento del Agua de Alimentación en Fábricas de Natal

K. DOWES-DEKKER, *South African Sugar Journal*, Vol. 41, No. 4 págs. 281-285 (1956).

Debido a la posible presencia de azúcar en el condensado de evaporadores, las fábricas de azúcar en Natal prefieren usar agua de río para complemento en sus calderas. Para impedir la incrustación de las superficies térmicas de las calderas, el método más económico es agregar fosfato al agua de alimentación; esto impide la formación de incrustación compuesta de sulfato o carbonato. Sin embargo, en este tratamiento es necesario mantener la alcalinidad del agua de la caldera perfectamente regulada. Cuando la alcalinidad es demasiado baja, el magnesio se precipita como hidrofosfato; cuando la alcalinidad es demasiado alta, ataca y remueve la película protectora de hidrato ferroso que se forma naturalmente en las paredes de la caldera. La mejor condición se establece cuando la alcalinidad corresponde a cinco partes de NaOH por millón y una concentración de P_2O_5 que no excede de 1.5 partes por millón.

La presencia de aceite en el agua favorece la formación de incrustación en la caldera. Por otra parte, la acción protectora del fosfato es favorecida por la adición de ciertas substancias orgánicas como almidón y tanino. El oxígeno y gas carbónico en el agua de alimentación tienden a aumentar la corrosión en las paredes de calderas. Esto se puede evitar y la película de hidrato ferroso se puede formar nuevamente manteniendo la alcalinidad del agua de alimentación al grado recomendado. Los gases citados se pueden remover desaereando el agua antes de pasar a la caldera o agregándole sulfito de sodio; el carbonato de sodio no se debe usar en calderas.

■

El Uso de Versene in la Industria Azucarera

N. A. RAMAIAH, *Indian Sugar*, Vol. 7, No. 1, págs. 43-49 (1957).

El Versene, o ácido etileno-diamina-tetra-acetico, es un compuesto orgánico cristalino, notable por su capacidad de reaccionar con compuestos insolubles de metales pesados y metales alcalino-térreos para formar substancias solubles llamadas "quelados" o "quelatos". Por su propiedad de mantener en solución substancias que de otro modo son insolubles, se está usando en la industria azucarera para los siguientes fines: calcular los contenidos de calcio y magnesio en jugos de azúcar, calcular los azúcares reductores, eliminar los "errores del plomo" en análisis de azúcar, limpiar tubos de evaporadores, y limpiar paños de filtros.

En el Kanpur Sugar Institute (Instituto Azucarero de Kanpur) se concibió un método eficaz y sencillo para determinar azúcares reductores por titulación. Este método es muy similar al de Fehling, con la diferencia que en vez de usar la mezcla de Fehling, se usa una solución compuesta de nueve gramos de sal sódica de Versene, cinco gramos de NaOH y 3.5 gramos de $CuSO_4$ en 100 ml de agua. Como indicador, se usa azul de metileno. El nuevo reactor a base de Versene es relativamente estable; con él se obtienen los mismos valores de titulación aun a los quince días después de su preparación.

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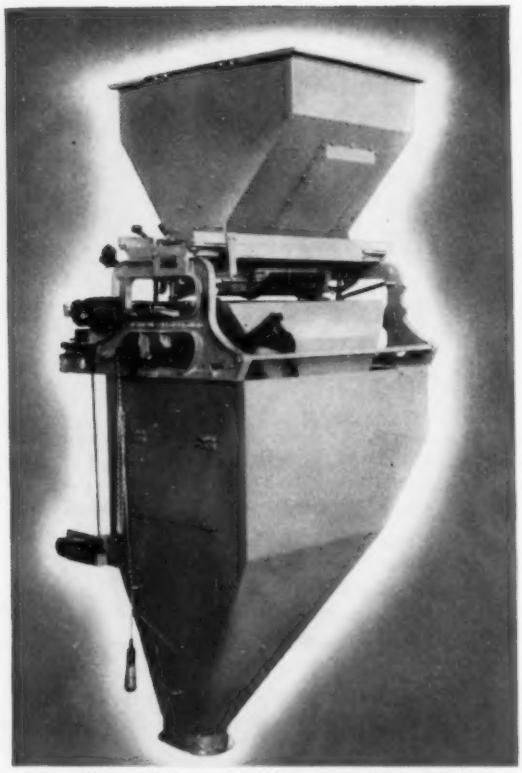

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En los análisis de azúcar rutinarios se agregan sales de plomo para los fines de clarificación. Estas sales de plomo introducen errores en las lecturas de pol por la formación de complejos de plomo que tienen diferente poder giratorio. El Versene "quelata" estos compuestos de plomo y evita este error. En la práctica, se agrega una cantidad proporcional de una mezcla de Versene e hidróxido de sodio; entonces no es necesario separar el plomo de la solución, agregándole ácido oxálico, o sus sales, o fosfato de sodio, etc., y luego extraer el precipitado de plomo por filtración.

El uso de Versene para remover la incrustación en tubos de calentadores, evaporadores y columnas destiladoras todavía se encuentra en la etapa experimental, pero los resultados a la fecha son muy alentadores. De momento, la principal dificultad está en el alto costo de Versene; sin embargo, este inconveniente puede ser vencido en gran parte por la regeneración de la solución de Versene usada en los trabajos de limpieza, lo que se puede lograr acidificándola con ácido sulfúrico concentrado a 3.0-3.5 de pH, calentándolo y revolviéndolo durante 30 a 40 minutos; luego se filtra el sulfato de calcio precipitado, el licor se transfiere a otro recipiente y se trata con mas ácido hasta 1.4-1.8 de pH, y el ácido de Versene se deja cristalizar y, después de filtrarlo y dejarlo asentar, se puede convertir otra vez en sal sódica.

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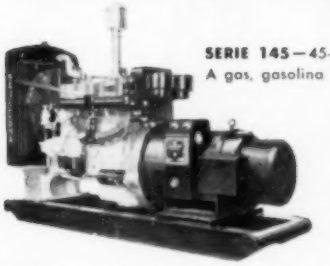

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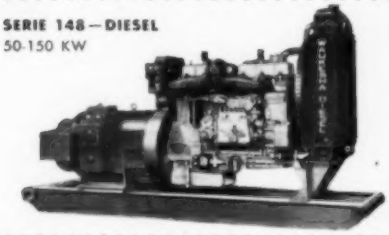
A gas, gasolina



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SERIE WAK—75-170 KW
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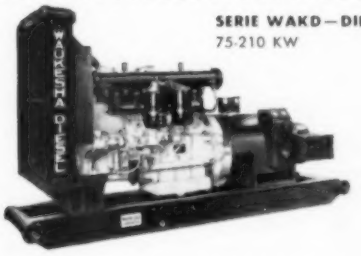
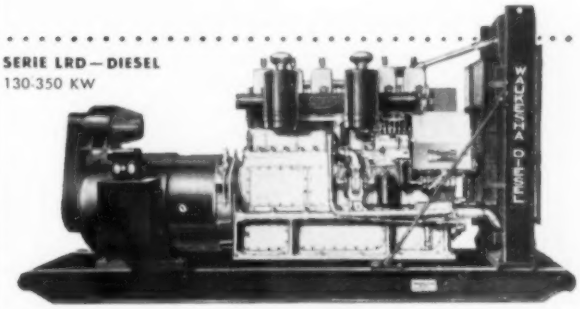
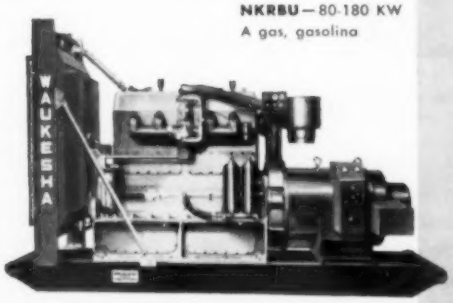


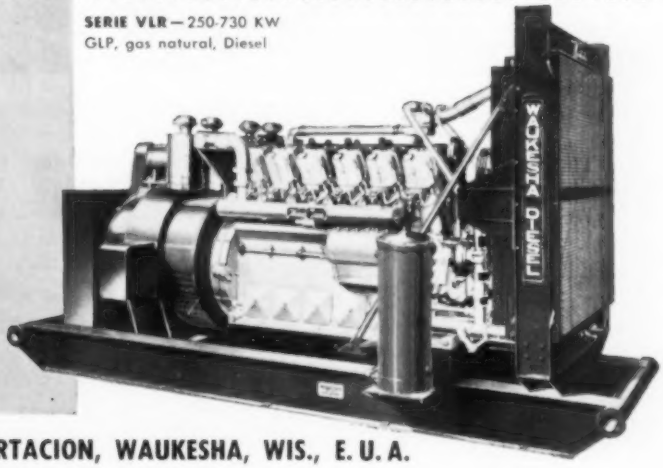
SERIE WAKD—DIESEL
75-210 KW



SERIE LRD—DIESEL
130-350 KW



NKRBU—80-180 KW
A gas, gasolina



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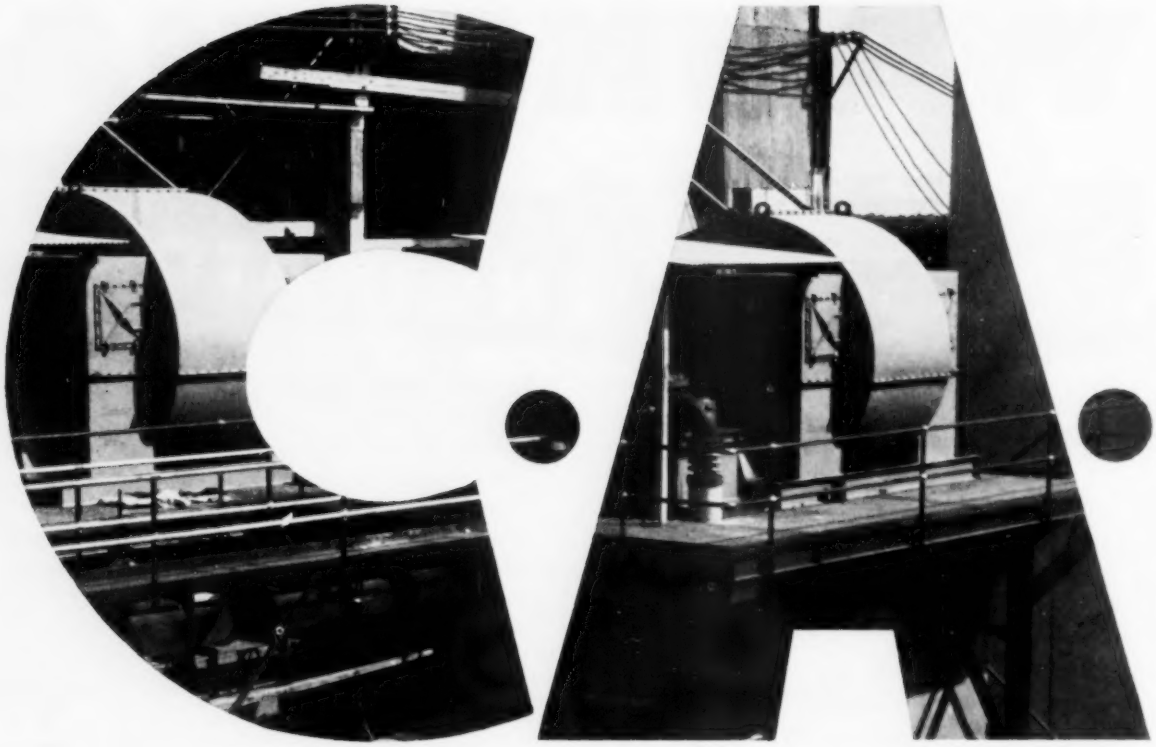

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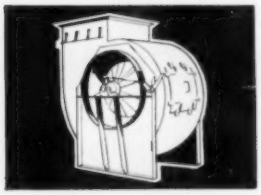

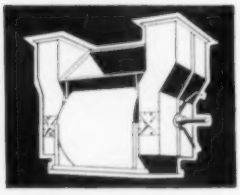

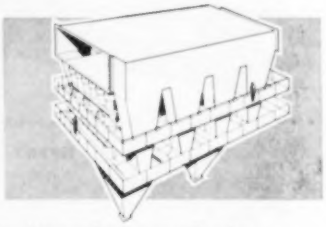

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FLY ASH WHIRLEX ARRESTOR

THE FLY ASH ARRESTOR CORPORATION

267 North First Street Birmingham, Alabama, E. U. A.

Nuevos Camiones Agrícolas International

Modelo A-160 con carrocería de estacas, PBV de 19.000 lbs.

MAS MODELOS EN EL MAYOR SURTIDO JAMAS PRESENTADO!

International siempre ha gozado fama de tener el surtido más completo de camiones agrícolas. Ahora la nueva Línea-A es aún más grande.

Note el nuevo Travelette que aparece a la derecha. Lleva seis personas . . . sin embargo, es también un camión de reparto. Qué conveniencia! Qué versatilidad! Vea el nuevo Travelall de abajo (siete modelos, incluyendo con propulsión en las cuatro ruedas) y el nuevo camión de reparto de uso general (acabado de dos tonos, cargas mayores).

Recuerde: sea el trabajo que sea, sea la carga que sea, hay un Camión International que lo puede hacer con más facilidad, rapidez y a un costo menor. Escoja de un surtido que abarca desde camiones de reparto de ½ tonelada a modelos para trabajo mediano con PBV hasta de 33.000 lbs.—en muchos estilos de carrocería particularmente adecuados para labores agrícolas.

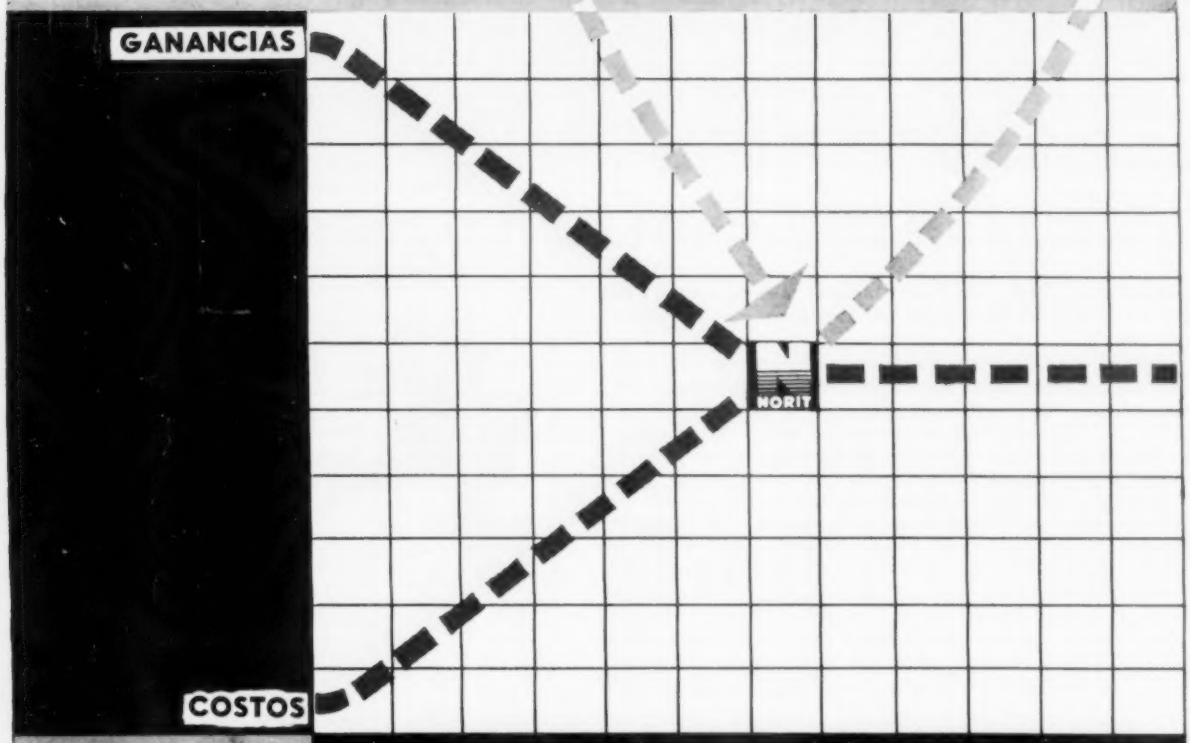
Vea al distribuidor International o solicítenos catálogo, mencionando PBV y estilo de carrocería. International Harvester Export Company, 180 N. Michigan Ave., Chicago 1, Ill., E. U. A.

Modelo A-120 Travelette para 6 hombres y carrocería de reparto de 6 pies.

Abajo, Modelo de Lujo A-120 de reparto y Travelall de ocho pasajeros, para uso general.

NORIT

se interpone en el punto crítico para estabilizar a un nivel razonable los costos y las ganancias



NORIT

UNITED NORIT SALES CORPORATION Ltd.

Amsterdam, Holanda

BETHLEHEM STEEL

EL REPRESENTANTE DE LA BETHLEHEM

Dondequiera que Ud. se halle estará cerca a la Bethlehem, a sus productos y a su representante.

En realidad, los productos Bethlehem están más cercanos a Ud., de lo que pudiera imaginarse. Forman parte de su vida diaria. Los encuentra en forma de planchas, perfiles de construcción, aceros de aleación, láminas, pletinas, hojalata, tubos, productos de alambre, varillas, barras, rieles, etc.

Y los amigables representantes de la Bethlehem son realmente sus vecinos, ya que se hallan en todos los rincones del mundo . . . ventajosamente situados para prestarle a Ud. servicio. Bethlehem Steel Export Corporation, 25 Broadway, New York 4, U. S. A. Cablegramas: "BETHLEHEM, NEWYORK."

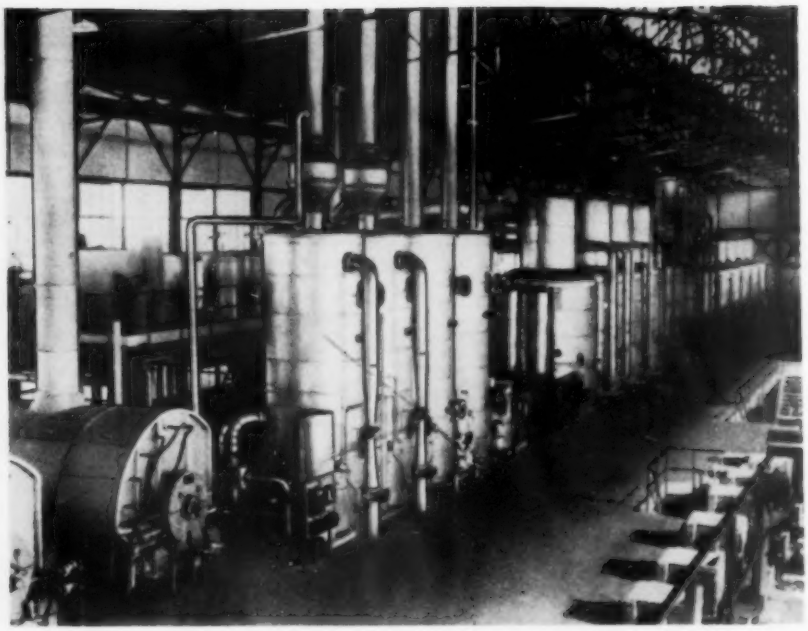
La gran fábrica de la Bethlehem en Sparrows Point, en el puerto de Baltimore, E. U. A., es la mayor planta siderúrgica del mundo situada a orillas del mar. Los productos de exportación de esta fábrica pueden ser cargados a bordo del buque ahí mismo.

Representada en todas las principales ciudades del mundo por las oficinas y representantes de la Bethlehem Steel Export Company

En Cuba: Bethlehem Steel Export Company, S. A.
Edificio Ambar Motors, Avenida Menocal y 23, Habana

8048

18



Vista interna de la Fábrica de Azúcar de Malatya (Turquia)

FABRICAS DE AZUCAR INSTALADAS DESDE 10 AÑOS

REMOLACHA

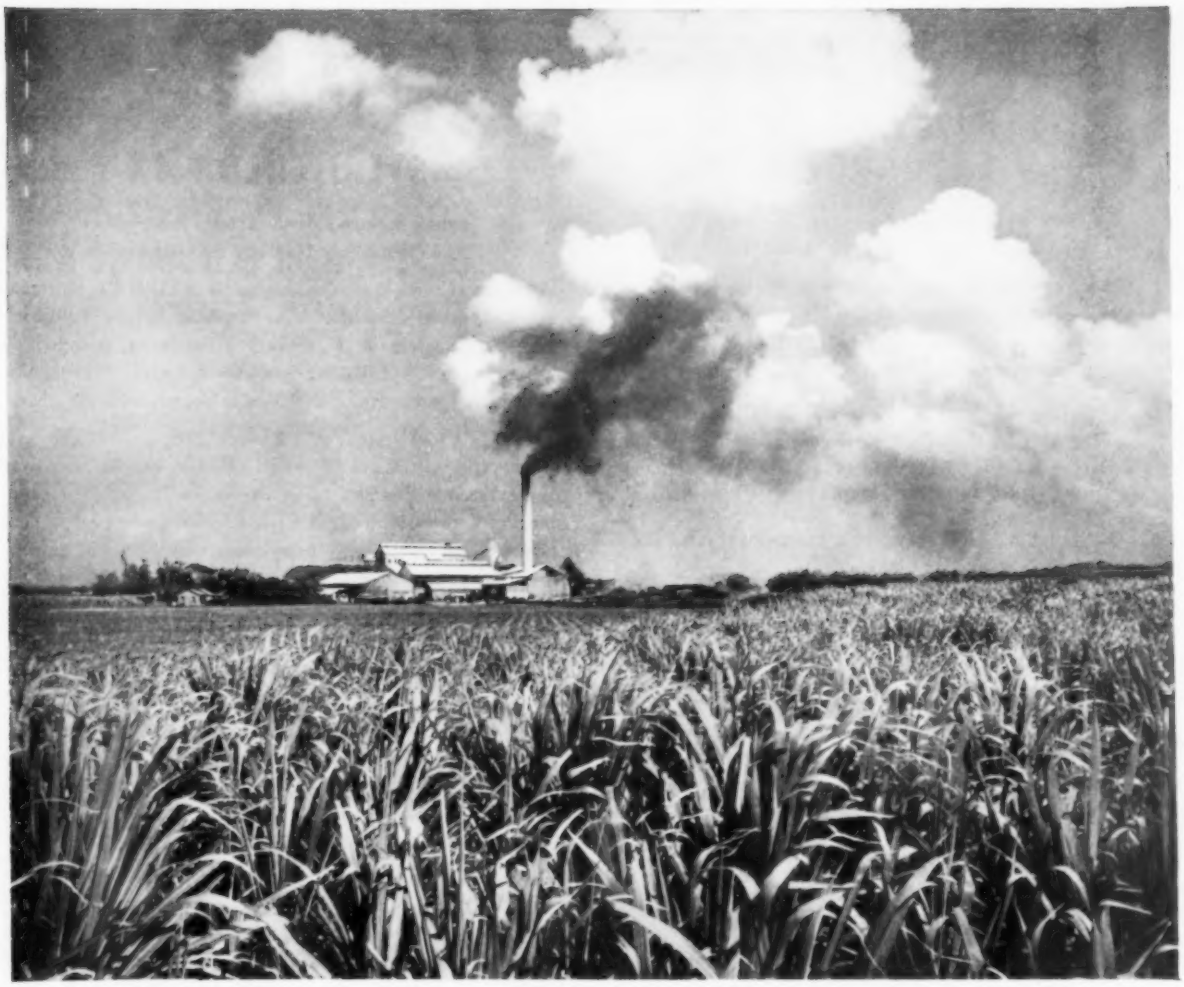
	T/dia
Francia	
Artenay	1200
Cagny	800
Corbeilles-du-Gatinais	1200
Origny-Ste-Benoite	900
St-Leu-d'Esserent	1000
Argelia	
Mercier-Lacombe	300
Turquia	
Kayseri	1800
Malatya	1200

CAÑA

	T/dia
Bolivia	
Guabirá	1000
Brasil	
Jacarezinho	600
Matosinhos	800
Vassununga	1000
Uruguay	
El Espinillar	1200
Venezuela	
Ureña	700
Madagascar	
Ankaratra	2500
Congo Francés	
Niari	1150
Congo Belga	
Uvira	1200
Thailandia	
Supanburi	1500

Cie DE FIVES-LILLE

7, RUE MONTALIVET - PARIS VIIIe • DIR. CABLEG : FIVILLE-PARIS



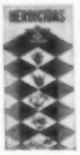
¡PRODUCTORES DE CAÑA!

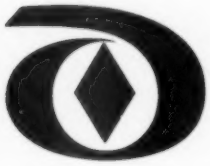
Mejoren su posición frente a la competencia utilizando los HERBICIDAS DIAMOND

El alza en el costo de producción y la competencia, cada vez más aguda, constituyen dos factores que militan contra las utilidades del productor de caña de azúcar.

Los herbicidas Diamond, por ejemplo, pueden afectar de modo decisivo el rendimiento de sus cosechas y las correspondientes ganancias. Estos herbicidas químicos realizan un trabajo mucho más eficiente que los procedimientos antiguos corrientes que extermina la maleza, — ¡y a la mitad del costo! Es más, al destruir las hierbas que minan el suelo, privando a los cultivos de valiosos elementos nutritivos y del indispensable acervo de humedad — que además dan albergue a multitud de plagas de insectos destructores — y aumentan el costo de la labranza — obtendrá Ud. cultivos *más sanos* y *más robustos*.

Permítanos comunicar su nombre a nuestro distribuidor en esa plaza. El puede suministrarle la información necesaria acerca de los productos agrícolas Diamond — como si fuesen socios comanditarios, que trabajan provechosamente para Ud. Al mismo tiempo podremos enviarle el Boletín PS-001, absolutamente gratis. Este boletín, que trata del mejor modo de utilizar los herbicidas, contiene también cuadros de recomendaciones y muchos otros datos de suma importancia y utilidad para Ud.





Diamond Alkali Inter-American Corporation

ROOM 1614 — 99 PARK AVENUE, NUEVA YORK 16, N. Y., E. U. DE A.
Dirección cablegráfica: DIAMALKALI

Aumente el Rendimiento de Azúcar a Bajo Costo

EXTRAPOL

acelera y aumenta la penetración del bagazo; reduce las pérdidas de sacarosa

Reduzca las pérdidas de sacarosa tanto como el 10%, aumentando el coeficiente de extracción un promedio de 5% . . . *sin* cambios de importancia en equipo. Use EXTRAPOL Wyandotte—un agente excepcional 100% tensoactivo.

Agregado al agua de maceración, EXTRAPOL acelera la penetración del bagazo y la hace más completa. Un ingenio con una molienda de 500,000 toneladas de caña anuncia economías en exceso de $15,000 al año con EXTRAPOL.

EXTRAPOL ha acusado una eficacia excepcional bajo condiciones adversas como las siguientes:

- Tres por ciento de sacarosa o más en el bagazo.
- Menos agua de maceración por ciento caña que la normal.
- Calentadores de jugo o evaporadores sobrecargados.
- Falta de tiempo en la faena de molienda para que el agua de maceración pueda penetrar el colchón de bagazo antes de pasar de un molino a otro.

La adopción de EXTRAPOL cuesta poco: sólo se necesita un pequeño tanque y una bomba dosificadora de precio módico. Y el consumo también cuesta poco—el que representa unas 24 libras por cada mil toneladas de caña.

STERI-CHLOR 4X

reduce la inversión de azúcar; aumenta el rendimiento por tonelada de caña molida

Aumente el rendimiento en azúcar tanto como 3½ toneladas por cada 1,000 toneladas de caña molida. ¿Cómo? Reduciendo la inversión de sacarosa y evitando la infección de dextrana con STERI-CHLOR 4X, el agente antienzímico Wyandotte exclusivo. Los consumidores anuncian hasta $100,000 de aumento en ganancias al año.

He aquí cómo trabaja el STERI-CHLOR 4X: Al desactivar las enzimas invertidoras de sacarosa en las babazas en el tándem y en residuos de bagazo deteriorado, reduce la contaminación de jugo . . . y produce coeficientes de glucosa mínimos.

Y al matar los microorganismos en los focos de infección en el tándem, STERI-CHLOR 4X contiene la infección de Leuconostoc, la causa de los problemas creados por la dextrana.

STERI-CHLOR 4X no es corrosivo; no puede dañar los metales ni el equipo. Y sólo se necesita equipo de poco costo para utilizar este potente germicida.

¿ESTA INTERESADO?

¿Desea más datos sobre las ventajas del uso de STERI-CHLOR 4X y EXTRAPOL? Entonces llene y devuélvanos el cupón inserto . . . *hoy mismo.*

Wyandotte CHEMICALS CORPORATION DIVISION J. B. FORD

Wyandotte Chemicals Corporation
Departamente de Exportación 3059
Wyandotte, Michigan, E. U. A.

Señores:

Sírvanse enviarme datos sobre cómo STERI-CHLOR 4X y EXTRAPOL aumentan los rendimientos de azúcar. Prefiero datos en español ☐ — en inglés ☐.

Nombre ..... Cargo .....
Empresa .....
Dirección ..... Ciudad .....
Estado o Prov. ..... País .....

NOTA: Para datos más completos sobre las posibilidades de los productos Wyandotte, acompañen datos sobre la operación de su ingenio.

Webster

SISTEMAS Y PIEZAS PARA EL MANEJO DE MATERIALES EN CENTRALES AZUCAREROS

WEBSTER es un fabricante integro de sistemas de conducción de la más alta calidad—sistemas que han dado excelentes resultados en el manejo de caña de azúcar en sus diversos estados de elaboración. Nuestro servicio comienza con un estudio y un diseño preliminares del equipo necesario, y puede terminar con la fabricación, montaje y prueba satisfactoria de su funcionamiento.

Los ingenieros de WEBSTER han contribuido notablemente a la evolución de sistemas para el manejo de bagazo y azúcar a granel que reducen los costos de producción. Nos será grato discutir la aplicación de estas mejoras a sus necesidades especiales. Escríbanos hoy mismo.

WEBSTER MANUFACTURING, INC.

Depto. S-28, Tiffin, Ohio, E.U.A.

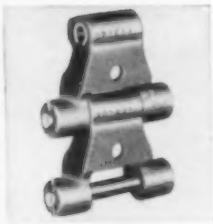
Oficinas de Ventas y Distribuidores en todas las principales ciudades

OFICINAS DE VENTAS EN PUERTO RICO

ABARCA WAREHOUSES CORP., San Juan

OFICINAS DE VENTAS EN CUBA

W. M. ANDERSON TRADING CO., S. A., Habana



Cadena

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Tablillas

Ruedas Dentadas

Respaldada Por 81 AÑOS DE EXPERIENCIA

Tanto si usted está comprando CADENAS, RUEDAS DENTADAS o TABLILLAS para repuesto, como un sistema para el manejo de materiales completamente nuevo, usted puede estar seguro de que el diseño, mano de obra y materiales WEBSTER le proporcionarán lo máximo en funcionamiento eficaz y largo servicio, seguro y económico.

WEBSTER fabrica un renglón completo de equipo de conducción, incluyendo—

MESAS DE ALIMENTACIÓN DE CAÑA
TRANSPORTADORES DE CAÑA
TRANSPORTADORES INTERMEDIOS
COLADORES DE JUGO
TRANSPORTADORES DE BAGAZO
TRANSPORTADORES DE BANDA
ELEVADORES DE CUBOS
TRANSPORTADORES EN ESPIRAL
TRANSPORTADORES DE CINTA
TOLVAS & COMPUERTAS
LANZADORES DE AZÚCAR
ARRUMADORES PARA BUQUES

ELEVATING AND CONVEYING MACHINERY · SINCE 1876 ·

Nueva Raedora de Rastrojos

Un desmenuzador de tierra que podría construirse a un costo de aproximadamente $2,000 y que consta de cuatro discos verticales giratorios, de 18 pulgadas de diámetro, equipados cada uno de cuchillas fijadas a un ángulo de 90 grados que desbaratan el suelo y los rastrojos de caña, ha sido perfeccionado en la Universidad del Estado de Louisiana. La máquina, diseñada por el ingeniero agrícola William T. Carter, con la cooperación de Edwin C. Simon, del personal de la estación azucarera de la LSU, debe ser tirado y accionado por un tractor y desmenuzará una faja de 20 pulgadas de ancho y seis pulgadas de profundidad, lo que basta para limpiar una hilera de rastrojos de caña. El desmenuzador efectuará, en una sola operación, trabajo que requiere tres herramientas y tres operaciones de utilizarse las herramientas convencionales, según el anuncio de la LSU.

■

Daniel Wadsworth Dirije la Palabra al Grupo Zerban

Daniel V. Wadsworth, de Refined Syrups & Sugars, Inc., pronunció un discurso ante la reunión mensual de la Zerben Sugarmen's Association, en el Chemists Club, en Nueva York, el 8 de enero. El Sr. Wadsworth habló sobre el viejo concepto del manejo de azúcar a granel, sobretodo en forma líquida, explicando algunas de las dificultades técnicas y financieras que tuvo que afrontar la pequeña compañía original que luego se convirtió en Refined Syrups & Sugars. La próxima reunión tendrá efecto el 12 de febrero. Los azucareros que visitan Nueva York son siempre bienvenidos en las reuniones mensuales.

■

Bibliografía Azucarera

FABRICACION DE AZUCAR BLANCO DE INGENIO

Por W. H. T. Harloff y H. Schmidt. 138 páginas. Discussión especial de los aspectos prácticos.

Español Solamente $3.20

MAQUINARIA Y APARATOS DE INGENIO

Por F. A. López Ferrer. Segunda edición, 1949. Obra consistente de 415 páginas en 18 capitulos. Trata de los calculos empleados en operaciones de molienda, elementos de mecánica, propiedades del vapor, cumbustibles, máquinas de vapor, turbinas, condensadores, entubado, bombas, transmisión de fuerza, fricción y lubricación, equipo de molienda, clarificación y evaporación, tachos al vacio, cristalizadores, centrifugas y equipo de refinería. En español solamente $6.20

Sugar y Azucar

Departamento de Libros

604 Fifth Ave., Nueva York 20,

N. Y., E. U. A.

Para combatir la maleza que invade la caña de azúcar sin cortarla, úsese

2,4-D y DOWPON

de

DOW

Los cultivos de caña de azúcar dan más rendimiento cuando los cañaverales están libres de maleza. De modo que se gana más combatiendo las malezas de hoja ancha y gramíneas de la forma más eficaz y económica que sea posible; es decir, con los matamalezas Dow.

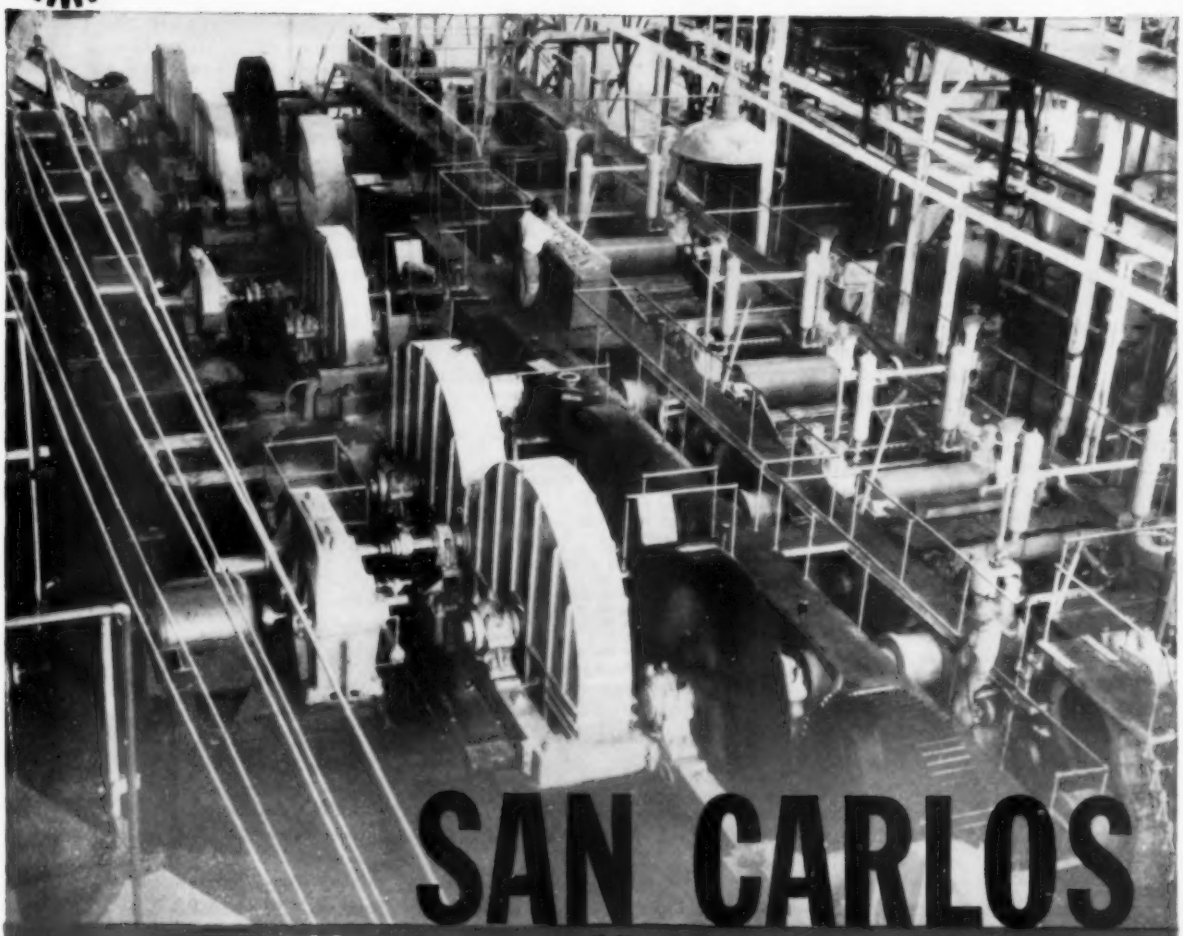
El Matamalezas 2-4 Dow Fórmula 40*, acaba con la maleza de hoja ancha. El Dowpon* combate la maleza resistente que antes había que cortar o azadonar. Con estos productos químicos modernos, usados por separado o mezclados, según el problema que se tenga que solucionar, se combaten los pastos y las malas hierbas. Ambos pueden aplicarse con rociadores de mano o mecánicos. Pida más informes al representante más próximo de Dow o a la oficina de Dow Inter-American que le corresponda.

**Marca de fábrica de The Dow Chemical Company, EE. UU.*

DOW CHEMICAL INTER-AMERICAN LIMITED • Edificio La Comercial, Paseo de la Reforma 122, México D. F. • Casilla de Correo 160, Montevideo, Uruguay • P. O. Box 488, Hato Rey, Puerto Rico
Midland, Michigan, EE. UU.

HOY Y MAÑANA... CONFIE EN DOW

CONSTRUIDO POR FULTON EN 1918
MODERNIZADO POR FULTON EN 1957



ECUADOR

. . . otro ejemplo de cómo la Fulton puede convertir sus viejos molinos en un tándem eficiente moderno.

En el Ingenio San Carlos . . . la Fulton agregó dos molinos nuevos a este tándem de 66 pulgadas . . . aumentando el número de mazas de 14 a 20.

Para un funcionamiento eficiente, Fulton convirtió el tándem a transmisión por turbina a vapor, con regulación central.

Resultado: La capacidad fué aumentada a 4,000 toneladas métricas de caña al día . . . con mejor extracción.

Para Su Programa de Modernización— Comuníquese con el Representante de Fulton en su comarca, o diríjase a la Fulton

Para mayor lucro por tonelada de caña, la respuesta siempre es . . .

FULTON IRON WORKS CO.
St. Louis 10, Missouri, U.S.A.

Ingenio San Carlos, Ecuador

Huntly Redpath Drummond

Huntly Redpath Drummond, miembro de la junta directiva y presidente de la Canada and Dominion Sugar Company, y miembro de la junta directiva del Banco de Montreal, falleció en diciembre último, a los 93 años de edad.

En 1910 sucedió a su padre, como presidente de la Canada Sugar Refining Co., Ltd., que pertenecía a la familia, y que más tarde se unió a la Canada and Dominion Sugar Co. En 1912 fue nombrado miembro de la junta directiva del Banco de Montreal, y presidente de la misma en 1943. También era presidente honorario de la Royal Trust Co., y miembro de la directiva de la Canada Bag Company.

El Sr. Drummond fue en entusiasta y activo deportista toda su vida, sobre todo en los deportes del esquí y la navegación en yate. La Universidad McGill, de la cual fue gobernador muchos años, al honrarle con el título de Doctor en Derecho, señaló al Sr. Drummond por "su larga y distinguida carrera en los negocios, su emprendedor espíritu cívico, sus obras filantrópicas, y su vivo interés en la Universidad."

■

Reunión de Tecnólogos de la Industria Azucarera

Frank A. Monroe, presidente de la Directiva de Sugar Industry Technicians, Inc., ha anunciado planes provisionales para la reunión de esa Directiva poco antes de la primera sesión técnica.

La Directiva se reunirá el 11 de mayo. La primera sesión de trabajo de la Asociación tendrá efecto a las 4.30 p.m. el 12 de mayo y se celebrará el banquete esa noche. El programa para la sesión técnica de dos días de duración será anunciado en febrero y extracto preliminares de todos los trabajos serán distribuidos entre los miembros.

■

COMPRESORES — BOMBAS AL VACIO
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137 PCM 100 LPC 7 x 7 Ingersoll ESI
173 PCM 100 LPC 9 x 9 Ingersoll ESI
184 CFM 135 PSI 8 x 9 Ingersoll ES
320 CFM 125 PSI 10 x 11 Ingersoll ESI
354 PCM Vacio 14 x 5 Ingersoll ER
364 PCM Vacio 14 x 6 Ingersoll ER
434 PCM Vacio 14 x 7 Worthington HB (2)
464 PCM 100 PSI 12 x 11 Ingersoll ES
686 CFM 100 PSI 14 x 13 Worth HB
868 CFM 100 PSI 17-10 x 12 CP-OCB
622 CFM Vacuum 18 x 6 Ingersoll ER
1085 CFM Vacuum 21 x 9 Worthington
1270 CFM 40 PSI 19 x 13 Ingersoll ESI
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1882 CFM Vacuum 28 x 10 Penn 7A—(2)
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2832 CFM Vacuum 31 x 13 Ingersoll ESI
4063 CFM Vacuum 26-26 x 12 Amer.

Portátiles
30 PCM a 600 PCM—Gas—Diesel

American Air Compressor Corp.
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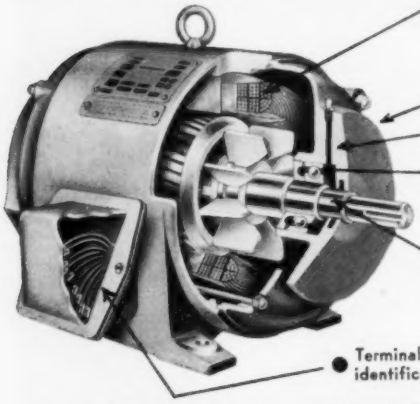
¡EL VIGOR DE LOS MOTORES BROOK A.C. no es simple casualidad!

Porque su diseño es el resultado de más de medio siglo de experiencia. Aunque han sido fabricados para superar las especificaciones de NEMA, no cuestan más que los motores corrientes. Se ofrecen motores monofásicos y polifásicos. Todos en tipos principales. Desde 1 a 600 HP. En existencia para embarque inmediato.



- Bobinajes duraderos de triple impregnación al fuego.
- Armazón de fierro, interiormente acostillado, y resistente a los golpes.
- Más que suficiente capacidad lubricante de rodamiento.
- Cojinetes de dos medidas más grandes que los corrientes, aunque reemplazables con los cojinetes de repuesto corrientes.
- Eje de acero de alta resistencia a la tensión y pulido a precisión; y ensamble equilibrado de rotor.
- Terminales claramente identificables.

DESDE 1904

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el motor más respetado del mundo

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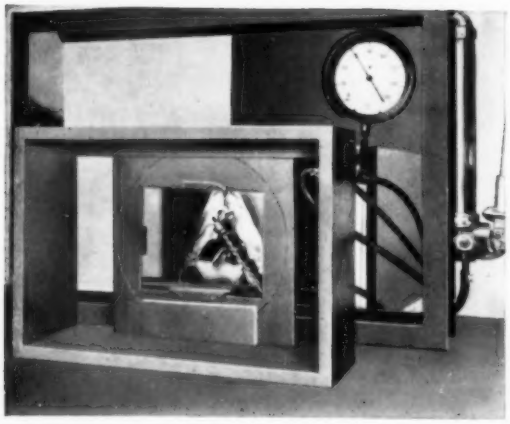
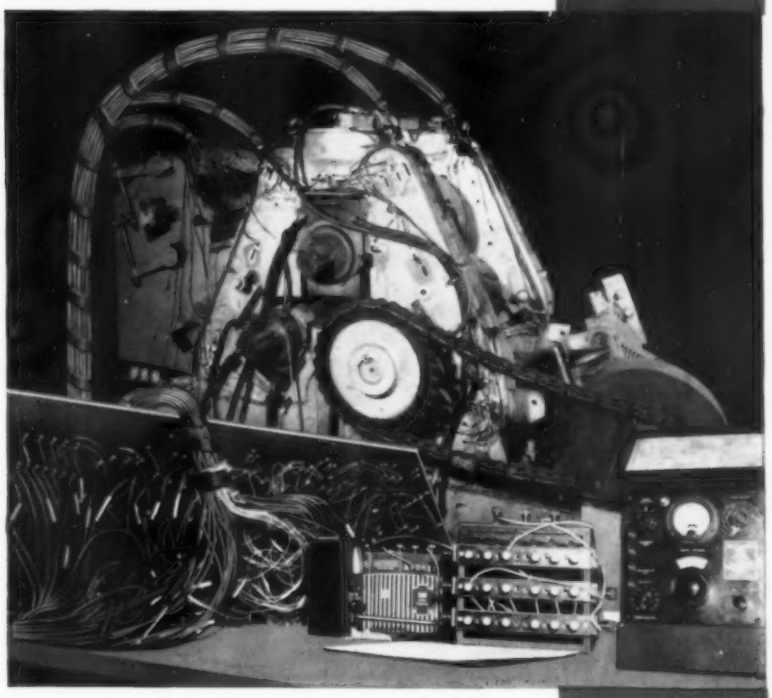
SQUIER

el trapiche que fué diseñado *CIENTÍFICAMENTE*



Análisis fote-elásticos de esfuerzos de un modelo de cureña del Trapiche Squier de tensión triangular.

Pruebas de análisis de esfuerzos en un Trapiche Squier de tres mazas.



- Solamente con extremo cuidado, extensas pruebas y repetidos ensayos se puede diseñar un producto que se ajuste a las condiciones requeridas por su uso final.
- Solamente después de que nuestros ingenieros hayan cumplido con estos requisitos se autoriza la fabricación de cualquier producto Squier en nuestros talleres y se hace disponible a la industria.
- Solamente Squier ha perfeccionado la cureña de tensión triangular y ha dado el gran paso de avance para reemplazar los molinos convencionales de diseño mediocre con molinos de moderna superioridad.

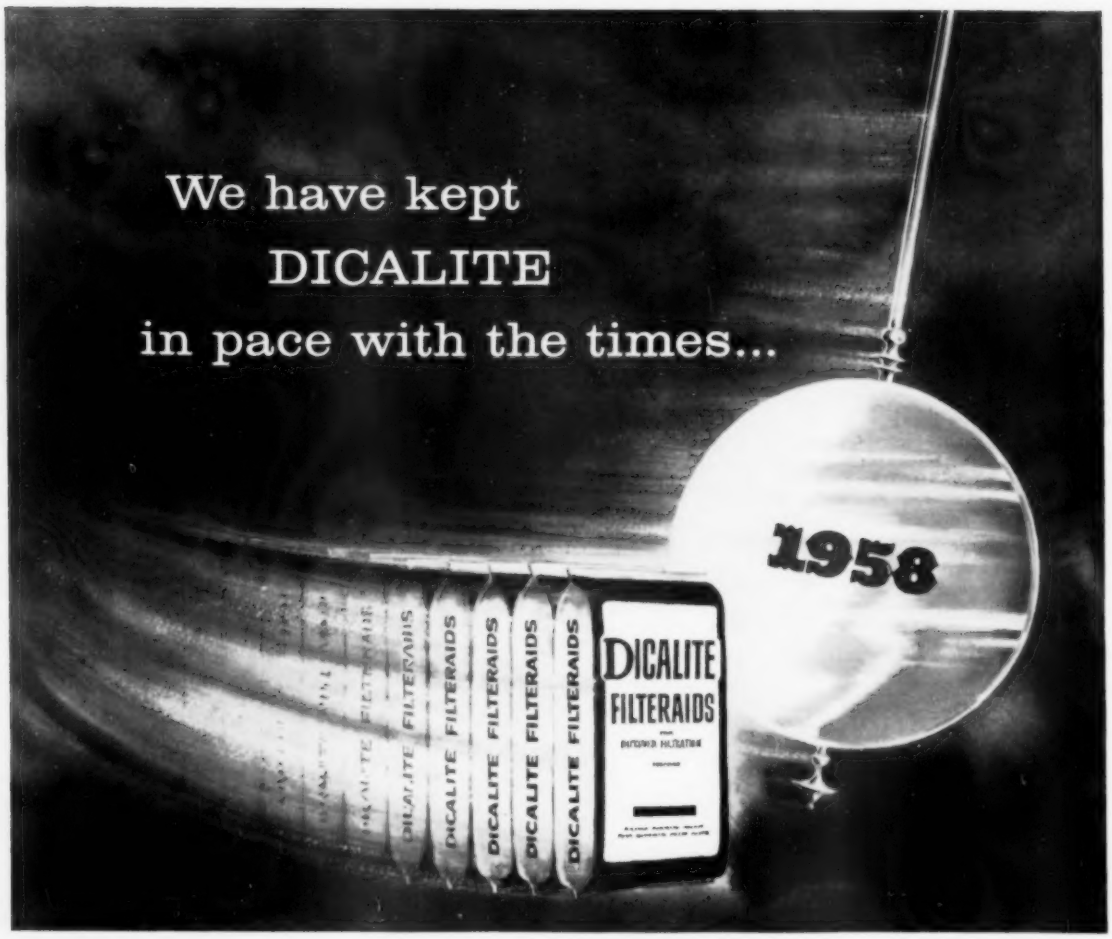
"Desde la Caña hasta el Saco de Azúcar"

SQUIER

THE **SQUIER** CORP.

INGENIEROS Y FABRICANTES

BUFFALO, NEW YORK, E.U.A.



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